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Scientific Research Monitoring on COVID-19

19 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

- **Diagnosis:** Potential diagnostic value and transmission of 2019-nCoV from saliva. Showed **saliva from deep throat** has the **highest positive rate**.
- **Treatment:** An article present a review on the current Pharmacologic Treatments for Coronavirus Disease 2019 and their effect.

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

Between Geography and Demography:Key Interdependencies and Exit Mechanisms for Covid-19

Gaps in India's preparedness for COVID-19 control

Africa in the Path of Covid-19

WHO daily report

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WHO daily report 18 April 2020

- No new country/territory/area reported cases of COVID-19 in the past 24 hours.
- WHO Regional Director for Europe Dr Hans Henri P. Kluge, has released a statement on the transition to a ‘new normal’ during the COVID-19 pandemic, stressing that it must be guided by public health principles.
- Refugees and migrants face the same health risks from COVID-19 as their host populations. WHO has published new guidance for refugees and migrants to be included in the public health response to the COVID-19 pandemic.
- WHO and Global Citizen are joining forces with many of the world’s leading musicians, comedians and humanitarians for the “One World, Together At Home” global special. It will be broadcast/livestream on major social media networks, streaming services, and major television networks worldwide on 18–19 April 2020.

WHO daily report

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WHO presents data on COVID-19 cases by age and sex. This data is based on nearly 750 000 WHO case reporting forms received from 113 countries, territories and areas.

- Beginning on 26 January, all Members States were requested to immediately report confirmed and probable cases of COVID-19 to WHO with a minimal set of information through a standardized case reporting form (CRF).
- As of 13 April, a total of 747 546 confirmed cases were documented which represent (44.0% of the confirmed cases reported globally)

Distribution of reported form:

- the European Region : 316 076 (42.3%).
- Region of the Americas : 415 484 (55.6%)
- Western Pacific Region : 10 662 (1.4%)
- Eastern Mediterranean Region: 4717 (0.6%)
- South-East Asia Region: 136 (0.02%)
- the Africa Region : none
- international conveyances. 471 CRFs
- 74% of all cases in the database are from United States of America, Italy and Germany

Figure 2: Distribution by age and sex of confirmed COVID-19 cases reported to the WHO case-based surveillance system to date.

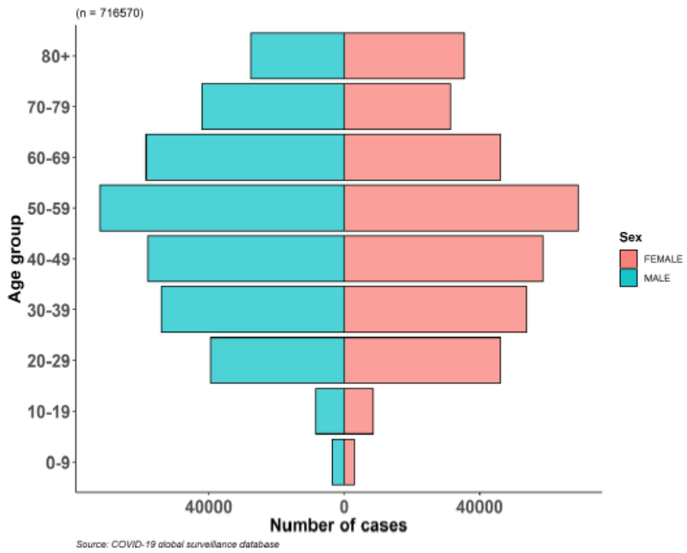
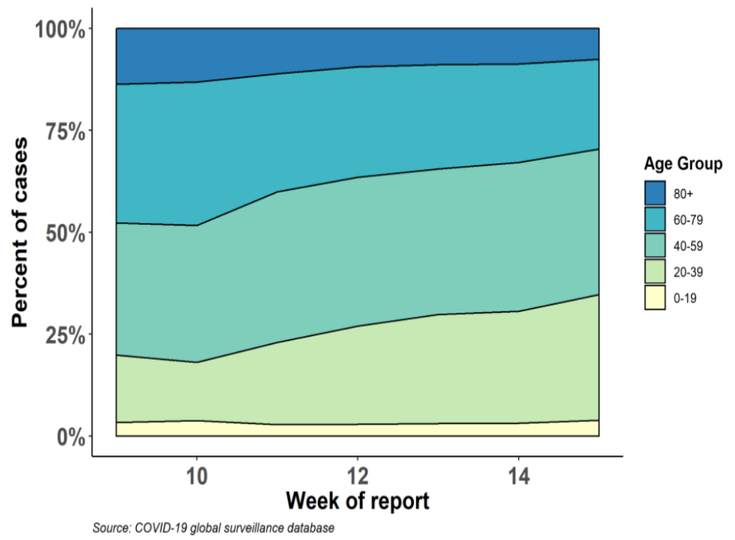


Figure 3: Distribution by age of confirmed COVID-19 cases reported to the WHO case-based reporting system from 24 February through 13 April, 2020. (n=715 130)



Epidemiology

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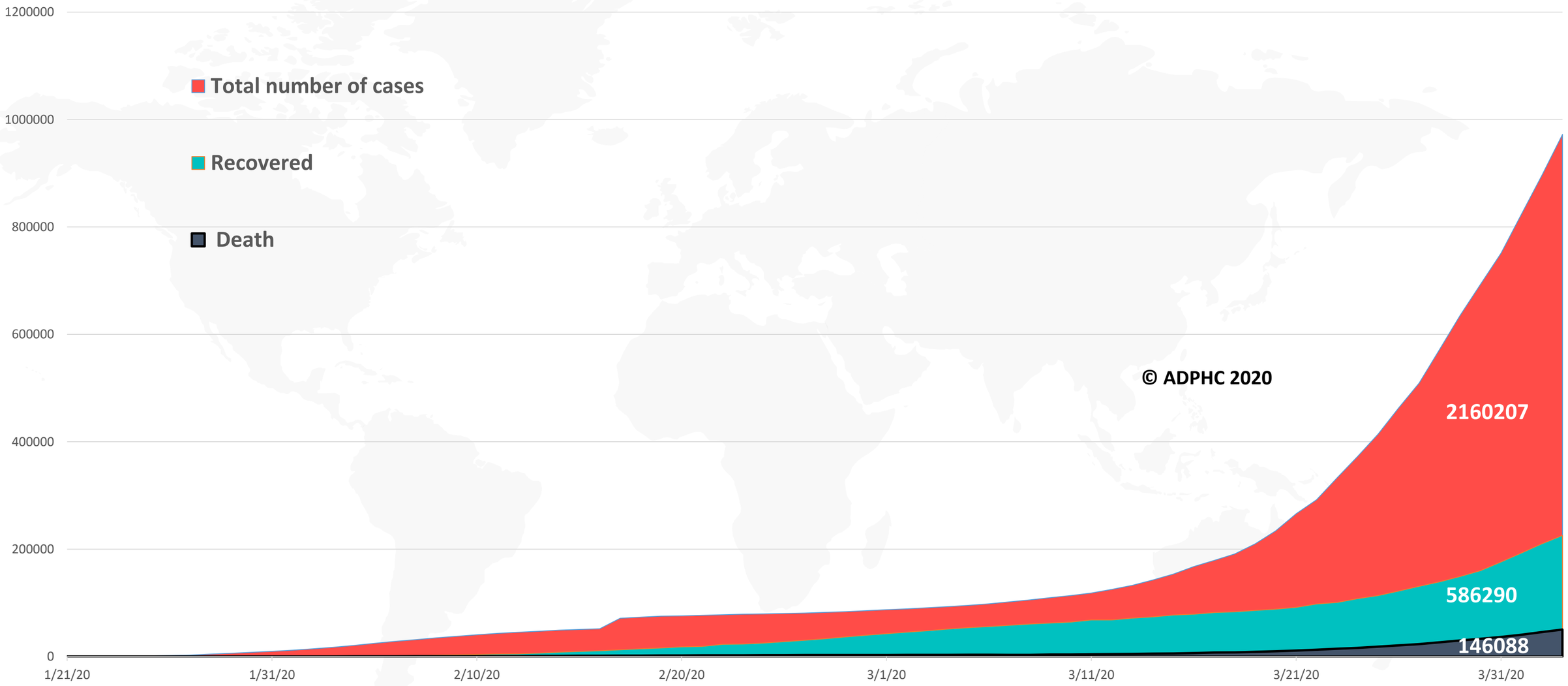
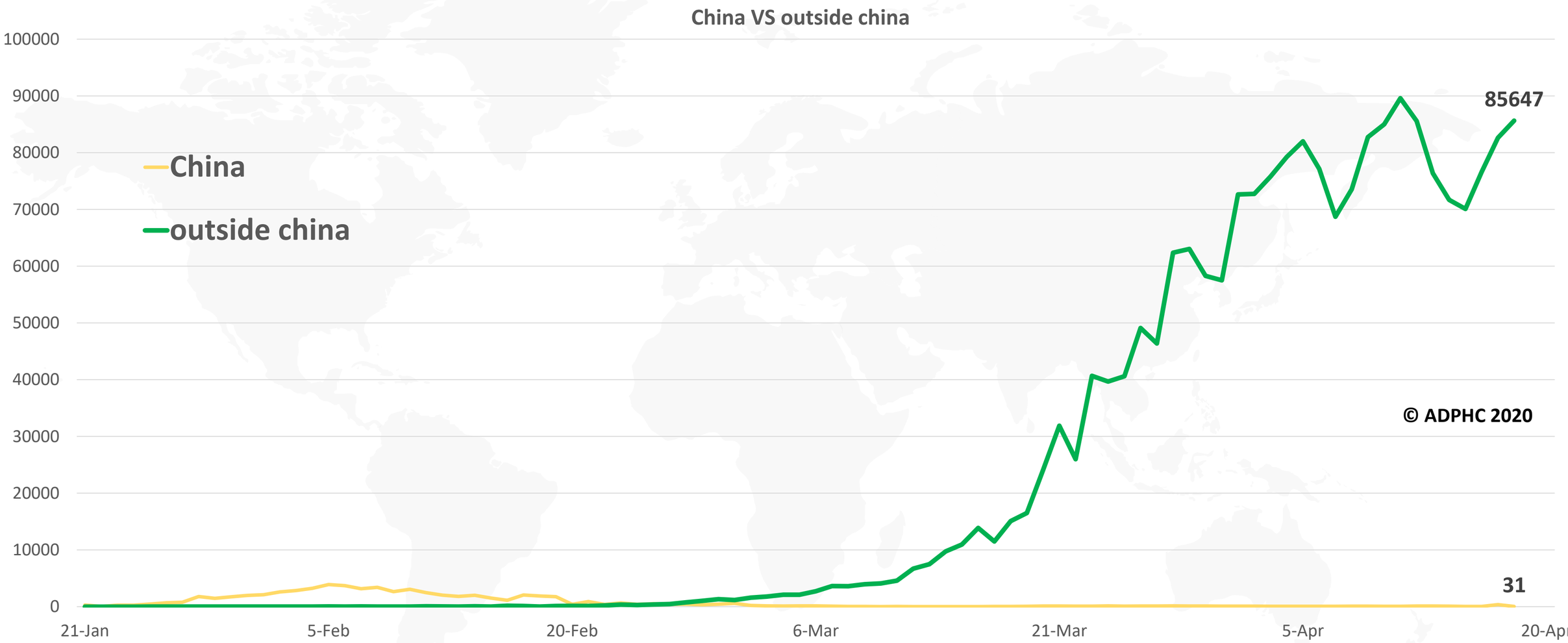
Figure 1: Total number of infected, recovered , and death cases (January 21st to April 18th , 2020)



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 18h, 2020).



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

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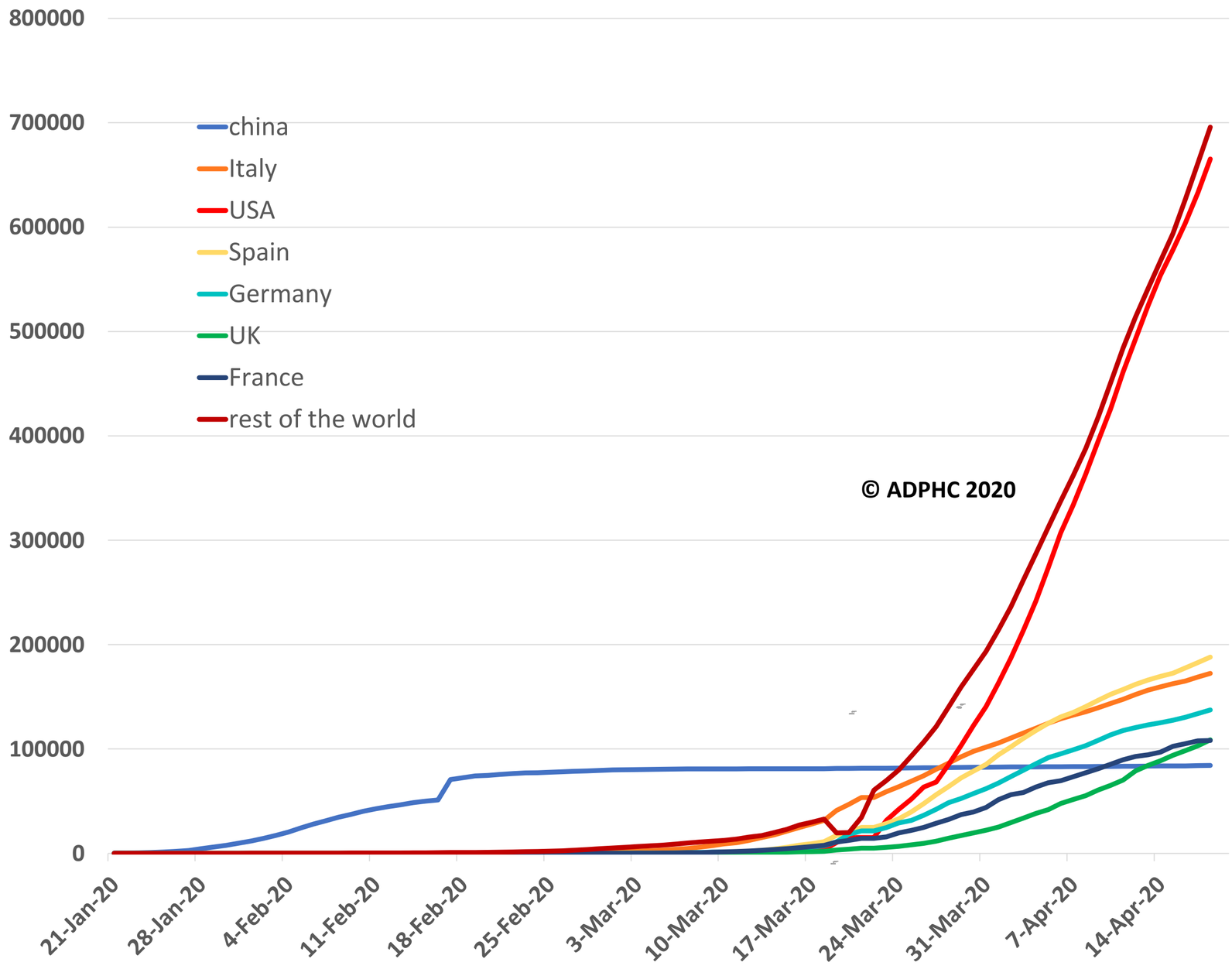
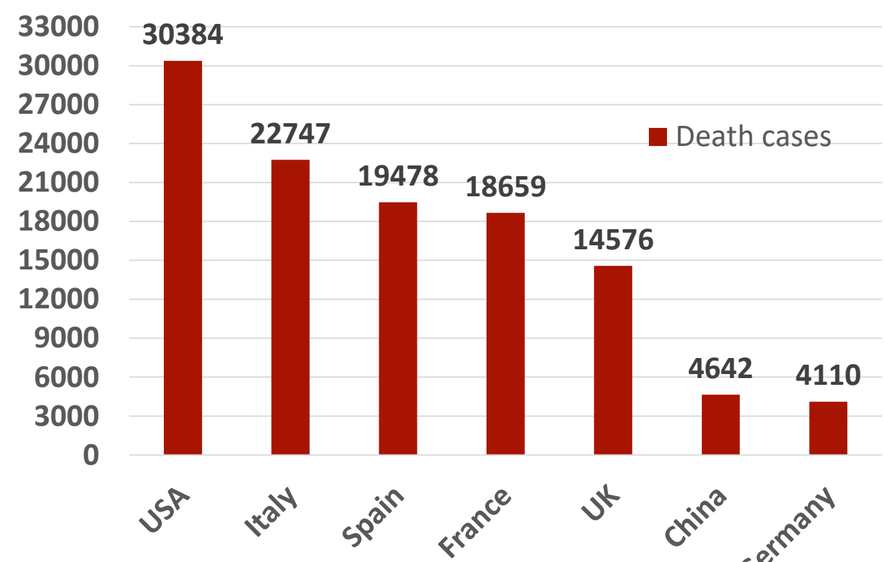
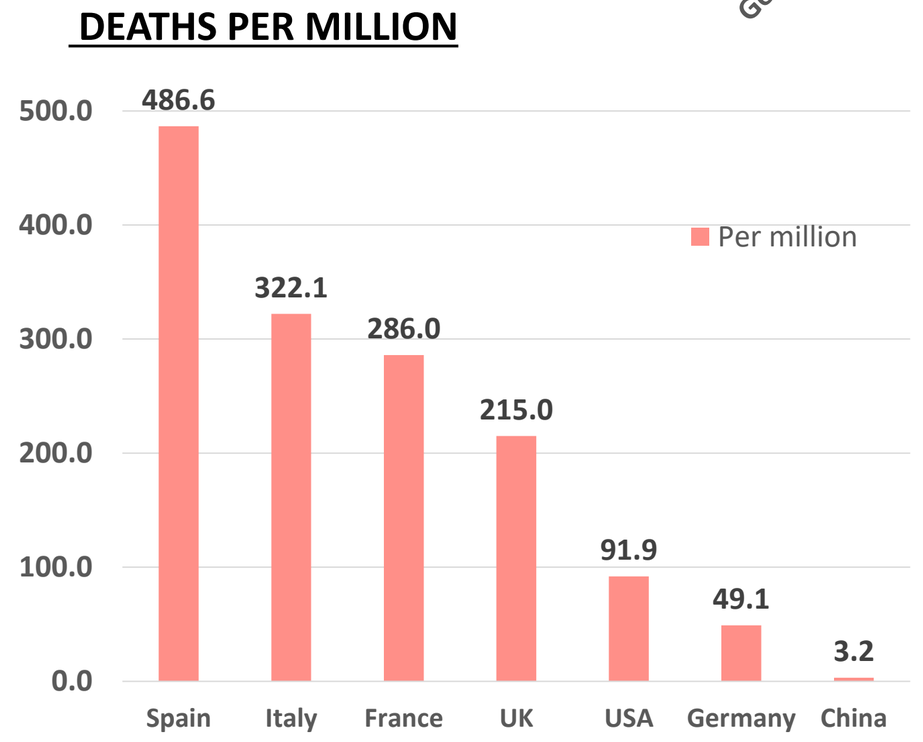
Figure 3 : Top 7 countries in the total number of cases due to COVID-19 (January 21 to April 18th, 2020).







Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: WHO

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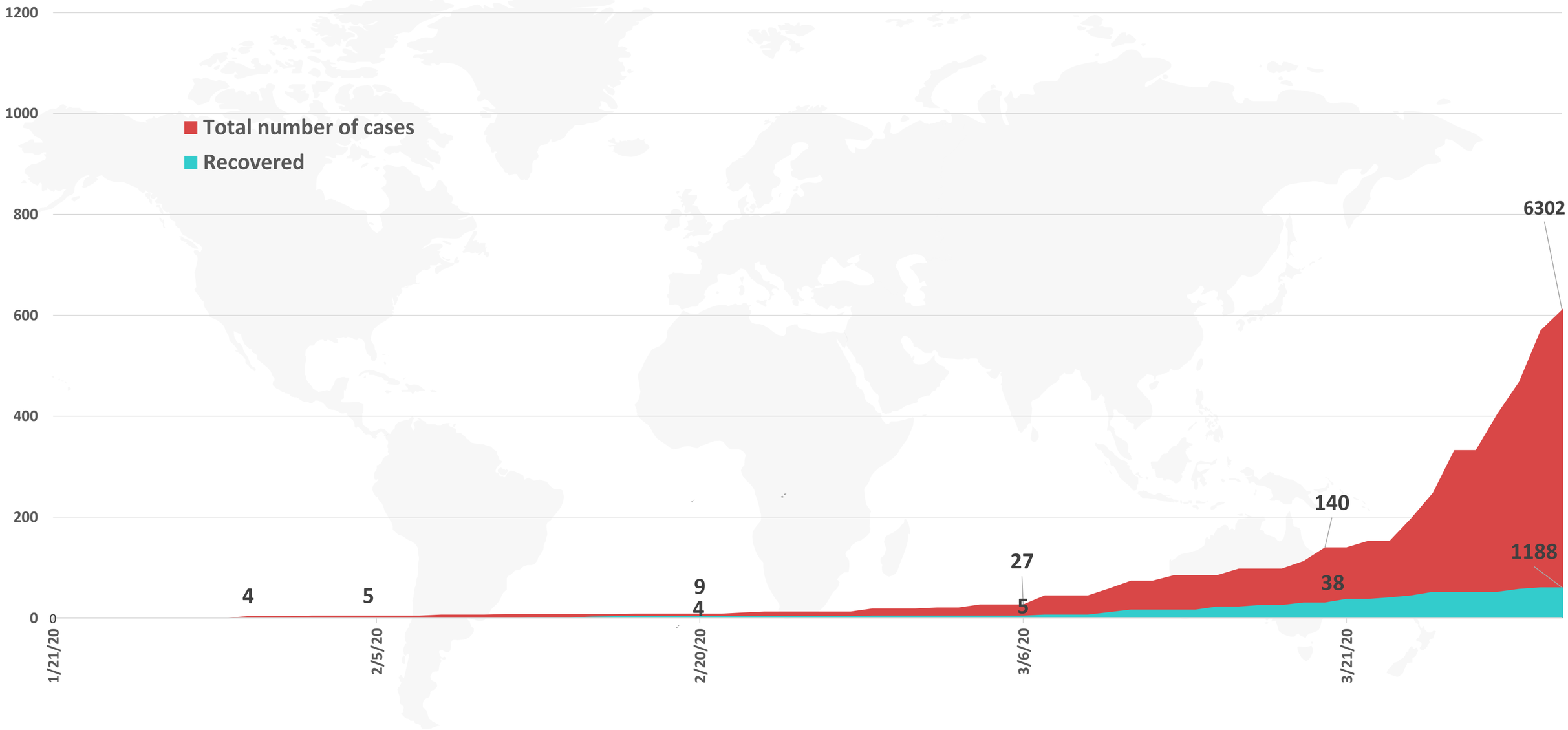
Figure 4: Total number of COVID-19 infected and recovered cases in UAE over time



Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: WHO, : John Hopkins University

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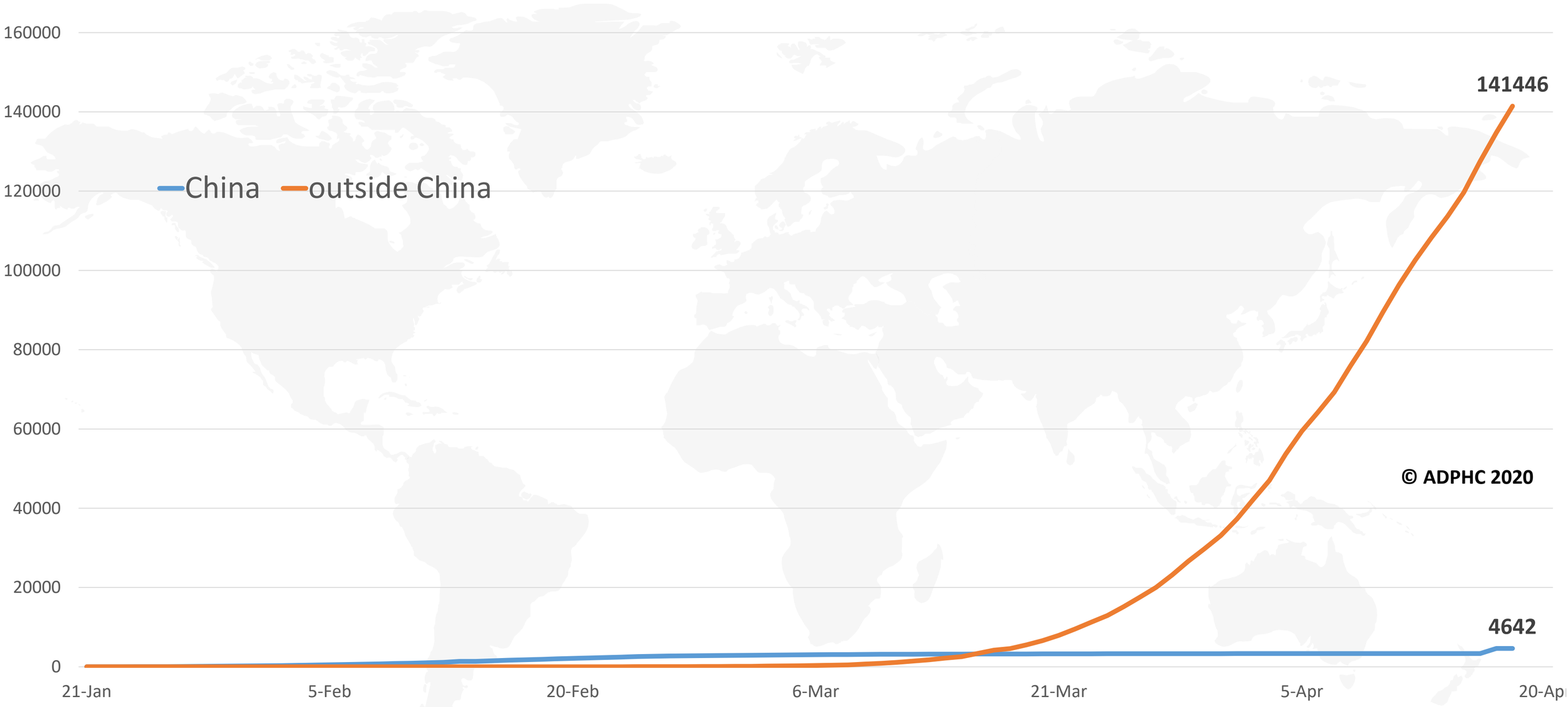
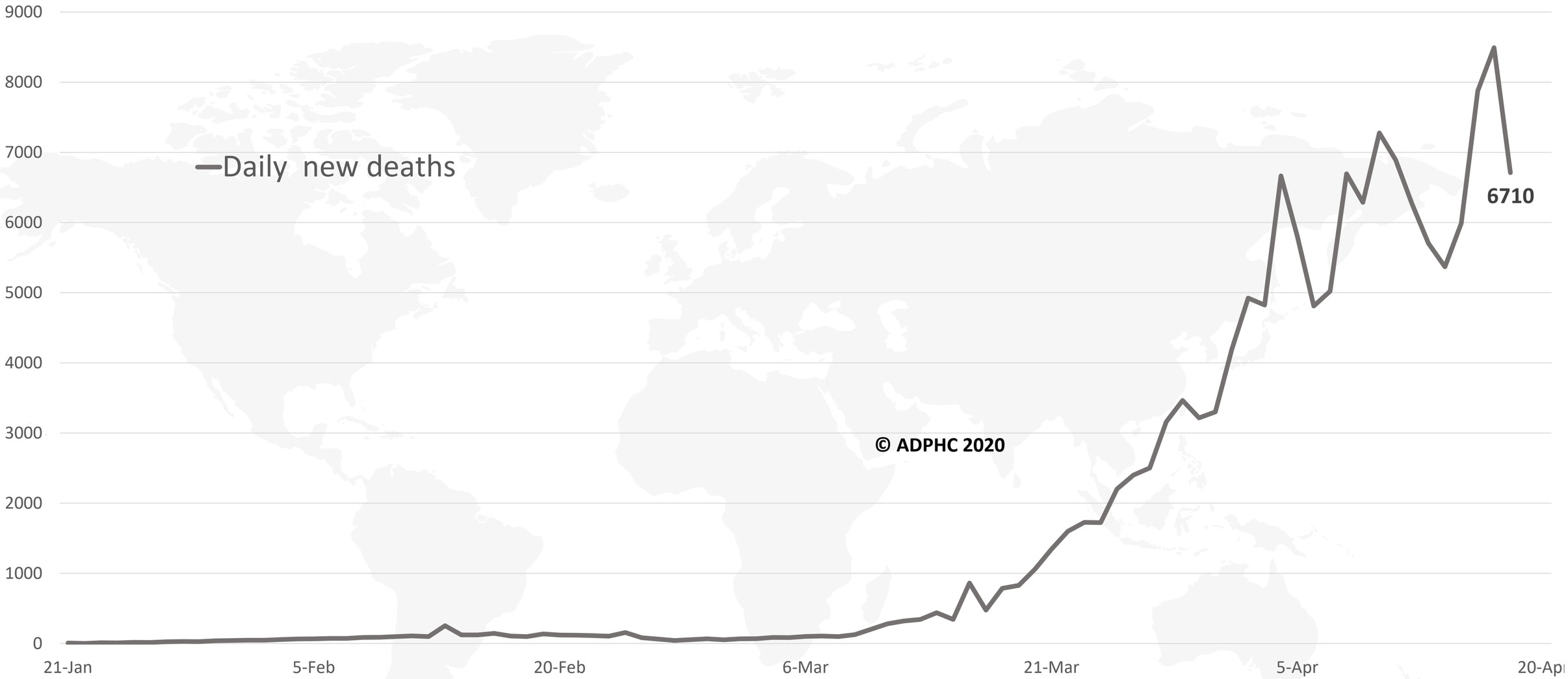
Figure 5: Total number of death due to COVID-19 reported by China and the rest of the world (January 21 to April 18th, 2020).



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 18th, 2020).



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

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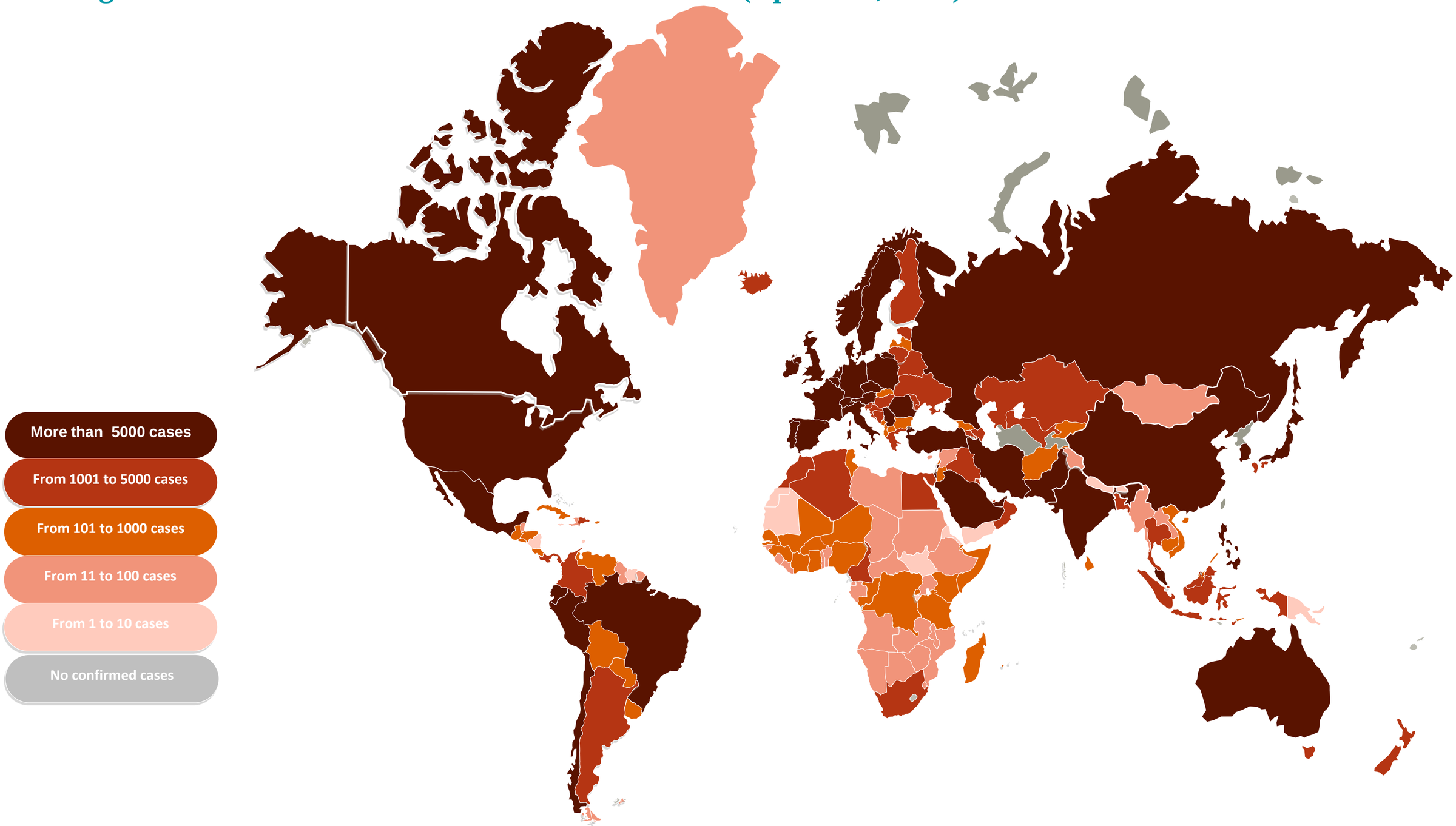
Figure 7a : Global distribution of COVID-19 cases (April 18th, 2020).



Map chart published by Abu Dhabi Public Health Center 2020.

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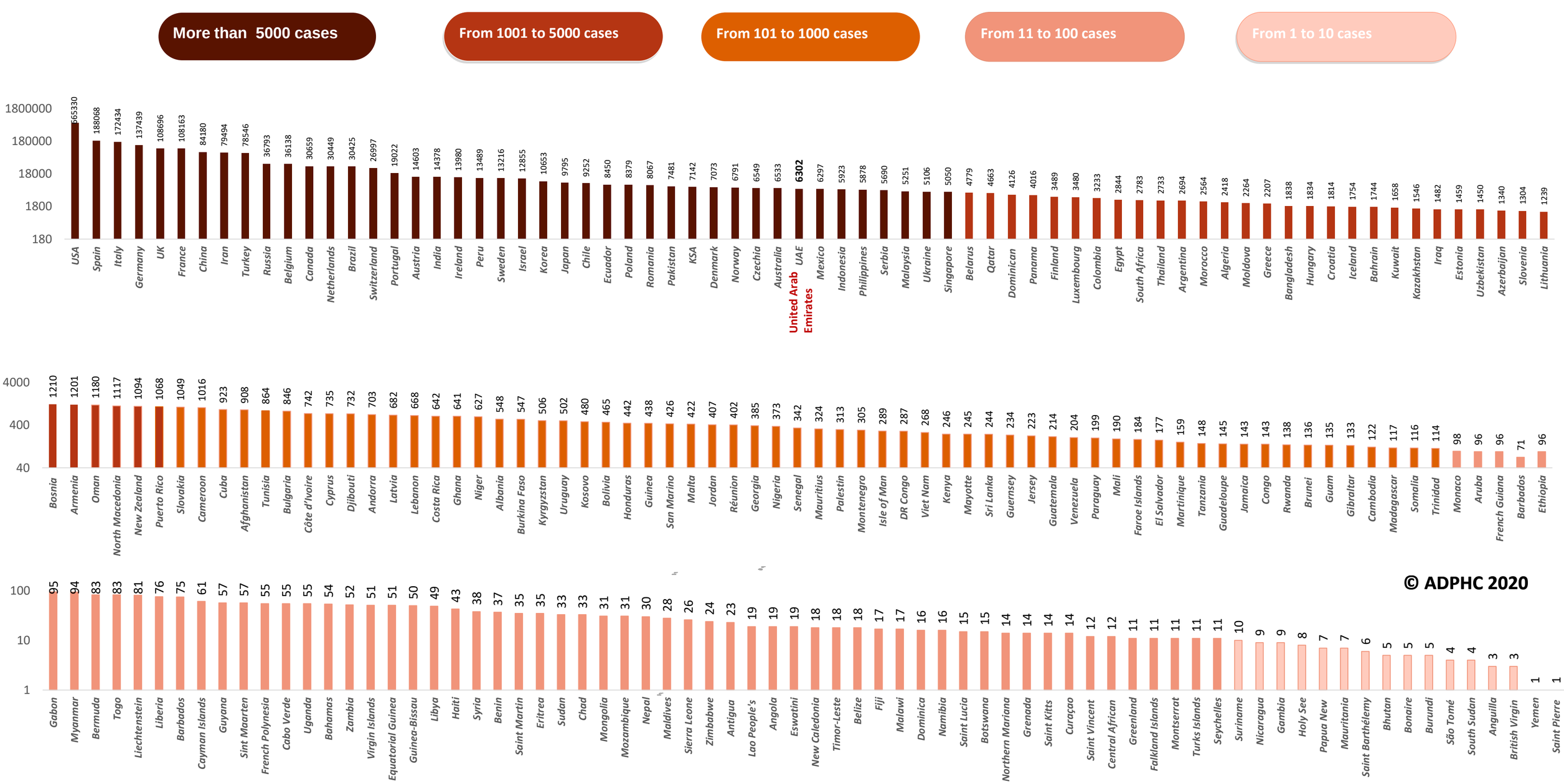
Figure 7B: Bar chart illustrate the global distribution of COVID19 cases April 18th, 2020)



Map chart published by Abu Dhabi Public Health Center 2020.

Data resources: WHO

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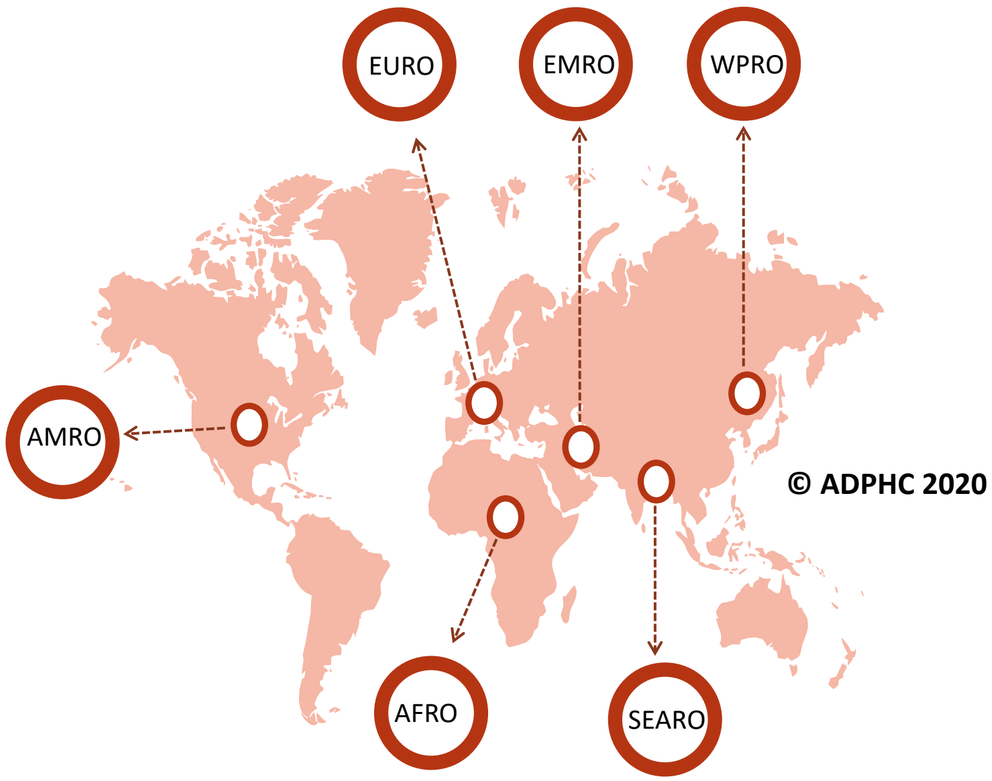
Figure 8: illustrate the Global distribution of COVID19 cases per region (April 18th, 2020)



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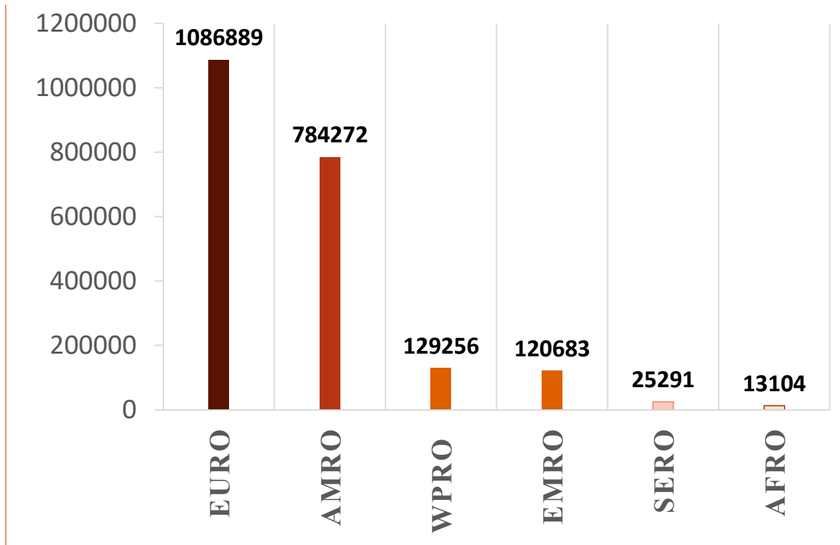
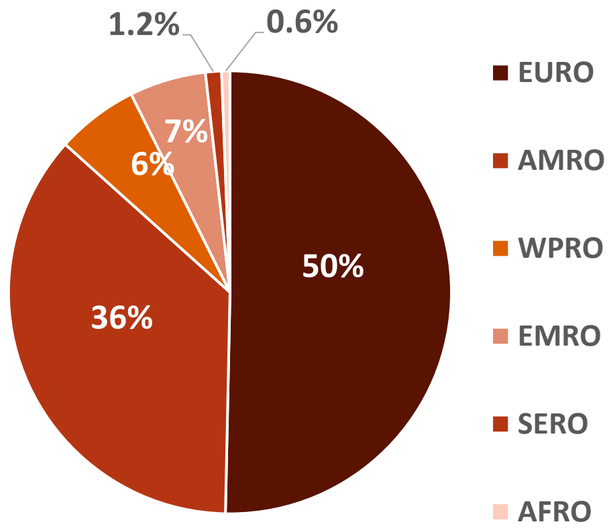
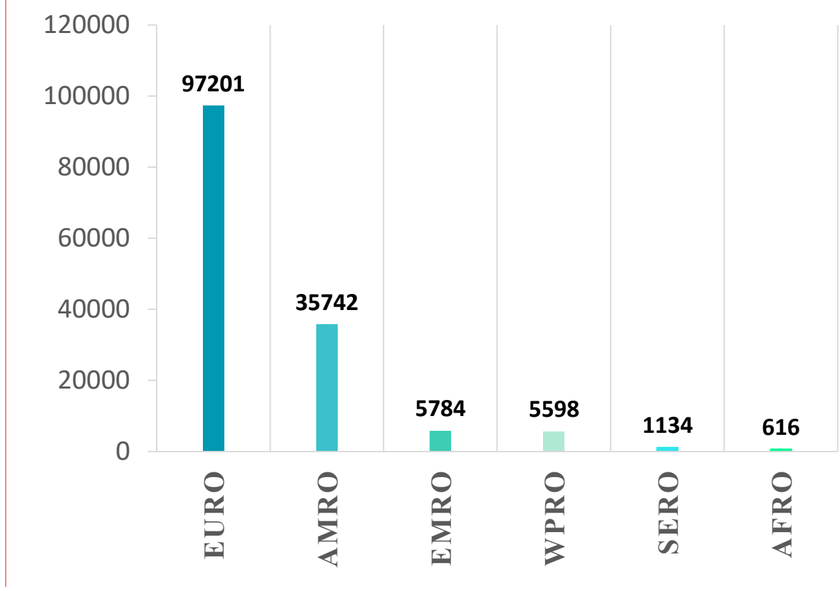
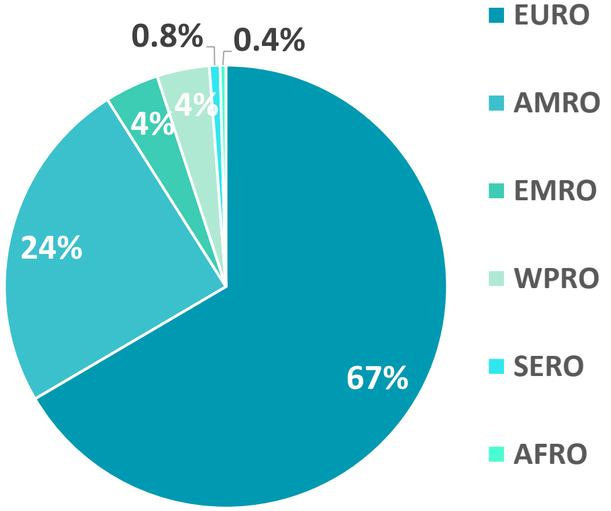
INFECTED





DEATH





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

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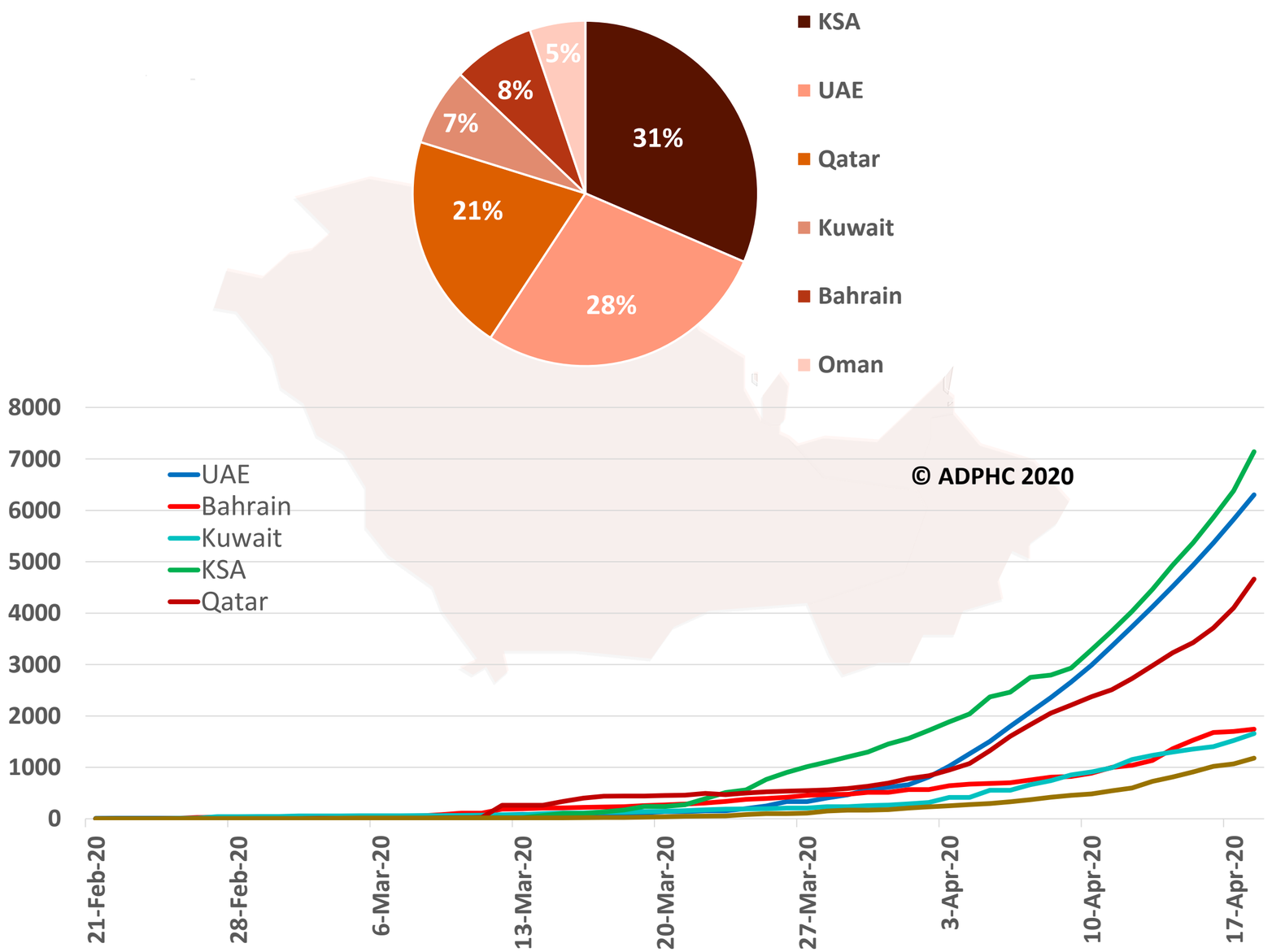
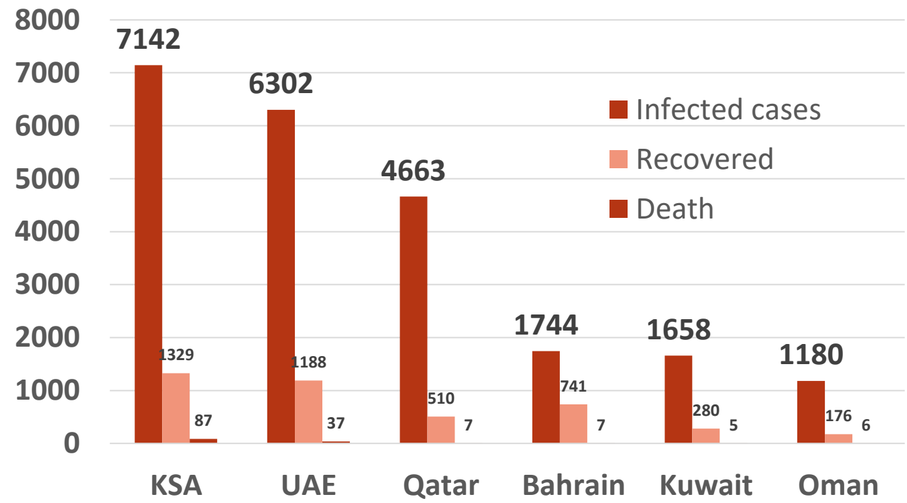
Figure 9: Comparative analysis of the distribution of COVID19 cases in GCC countries (April 18th, 2020)

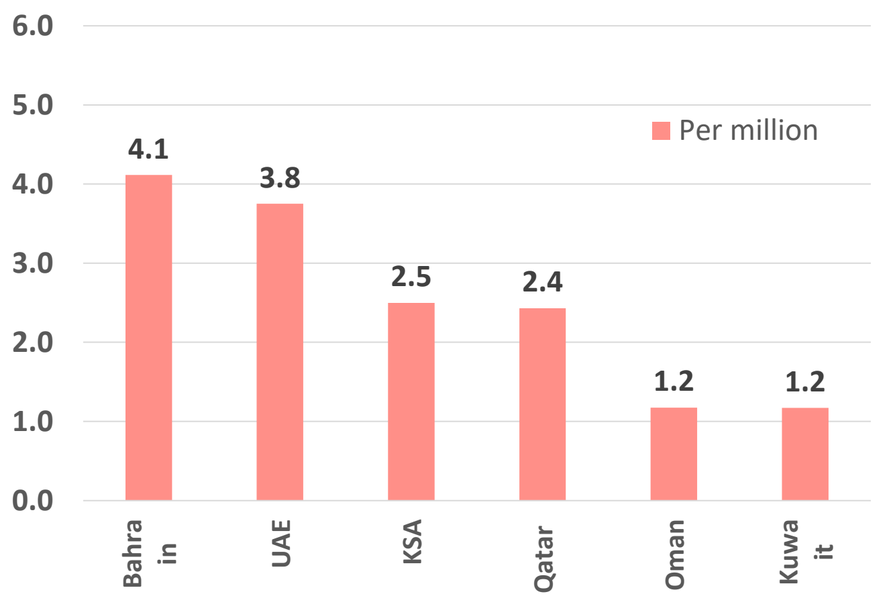
TOTAL NUMBER OF INFECTED CASES



Total number of infected, recovered and Deaths



Death per million



charts published by Abu Dhabi Public Health Center 2020.

Data resources: WHO

Diagnostic :

Article: Saliva: Potential diagnostic value and transmission of 2019-nCoV

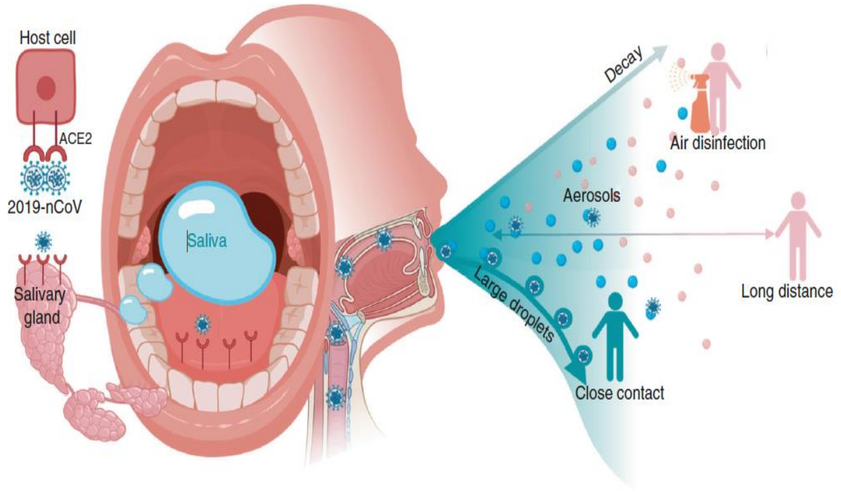
Published: April 17, 2020 in Nature

Summary:

This article give review summery on the current evidence and understanding of saliva role in diagnosis of SARS-COV2 and transmission.

- Diagnostic value of saliva depends on how saliva specimens are collected. Saliva from deep throat (91.67%) and 86.96% corresponding to two studies), from oral cavity (50%), or from salivary glands (12.90%) indicates a diagnostic tendency of decreased positive rate of 2019-nCoV RNA among COVID-19 patients.
- For clinical application in need of high positive rate of virus detection, **saliva from deep throat** has the **highest positive rate**, which may stand for early diagnosis of
- COVID-19. Saliva directly from saliva glands ducts is associated with severe COVID-19 and possibly could be a predictive and noninvasive test for severed patients.
- Whether 2019-nCoV RNA in saliva equals to infectious saliva or a condition of shedding vital virus is still lacking evidence.
- Even if diagnosis by saliva is noninvasive and less hazardous compared with throat swabs, comprehensive diagnosis should be supported by complete information of symptoms, epidemiological history, and analysis of multiple clinical examinations.

Figure 1 : mechanism of transmission



Understanding transmission:

- Besides lungs, oral tissue is possible to be directly invaded theoretically due to expression of ACE2 receptor and furin enzyme Saliva is a common and transient medium for virus transmission
- So far, **no solid evidence supports that SARS-nCoV or 2019-nCoV can survive in air outdoors for long time to set up long-distance aerosol transmission**.

Therefore, wearing masks to prevent formation of infectious saliva droplets projecting to the air, thorough disinfection of indoor air to block dissemination of infectious saliva droplets, and keep a distance with people not to acquire infectious saliva droplets could slow down 2019-nCoV epidemic to a certain degree (Fig. 1).

Treatment

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Article: **Pharmacologic Treatments for Coronavirus Disease 2019 (COVID-19)** A Review
Published: April 13, 2020 in JAMA
Summary: **This article give a review on the current and potential drugs for the treatment of COVID19.**

A. REVIEW OF SELECTED REPURPOSED DRUGS

Chloroquine and Hydroxychloroquine:

- Most of HCQ studies have limitation (sample size and design) that we cannot draw a conclusion from.
- Potential use of these drugs as prophylaxis post exposure is currently under investigation.
- Challenging in determining the proper dose is not yet known.
- Caution, of life threating but rare Cardiac complication complication with use specially in critically

Lopinavir/Ritonavir and Other Anti retrovirals:

- Early reports of lopinavir/ritonavir for the treatment of COVID-19 are **mostly case reports** and small retrospective, nonrandomized cohort studies, **making it difficult to ascertain the direct treatment effect of lop**inavir/ritonavir
- Although additional RCTs of lopinavir/ritonavir are ongoing, the current data suggest a **limited role for lopinavir/ritonavir in COVID-19 treatment**

Ribavirin

- The inconclusive efficacy data with ribavirin for other nCoVs and its substantial toxicity suggest that it has limited value for treatment of COVID-19.

Other Antivirals

- **Oseltamivir**: This agent has **no role in the management** of COVID-19 once influenza has been excluded.
- Umifenovir (also known **as Arbidol**) one study showed reduced mortality and improved outcome, This observational data cannot establish the efficacy of umifenovir for COVID-19, but ongoing RCTs in China are further evaluating this agent

Miscellaneous Agents

- **Interferon-α and –β:** Chinese guidelines list interferons as an alternative for **combination therapy** (ribavirin and/or lopinavir/ritonavir)
- **Immunomodulatory agents** such as baricitinib, imatinib, dasatinib, and cyclosporine showed in vitro activity to inhibit SARS-CoV-2.
- **Nitazoxanide**, traditionally an anti-helminthic agent (data on in vitro studies only showed inhibitory effects) .
- **Camostat mesylate** anti-pancreatic , in vitro studies show promising results.
- **ACE inhibitors and/or angiotensin receptor blockers** : May potentially treat COVID-19 or, conversely, worsen disease. **Conflicting in vitro data exist to determine if these agents have a detrimental or protective effect in patients with COVID-19**.

Treatment

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Article: Pharmacologic Treatments for Coronavirus Disease 2019 (COVID-19) A Review
Summary: Cont.,

B. REVIEW OF SELECT INVESTIGATIONAL DRUGS

Remdesivir

- successful case reports describing the use of remdesivir for COVID-19 have been reported
- Clinical trials are ongoing to evaluate the safety and antiviral activity of remdesivir in patients with mild to moderate or severe COVID-19

Favipiravir

- Limited clinical experience has been reported supporting the use of favipiravir for COVID-19.
- Favipiravir is currently available in Japan for the treatment of influenza, but not available in the United States for clinical use

C. ADJUNCTIVE THERAPIES

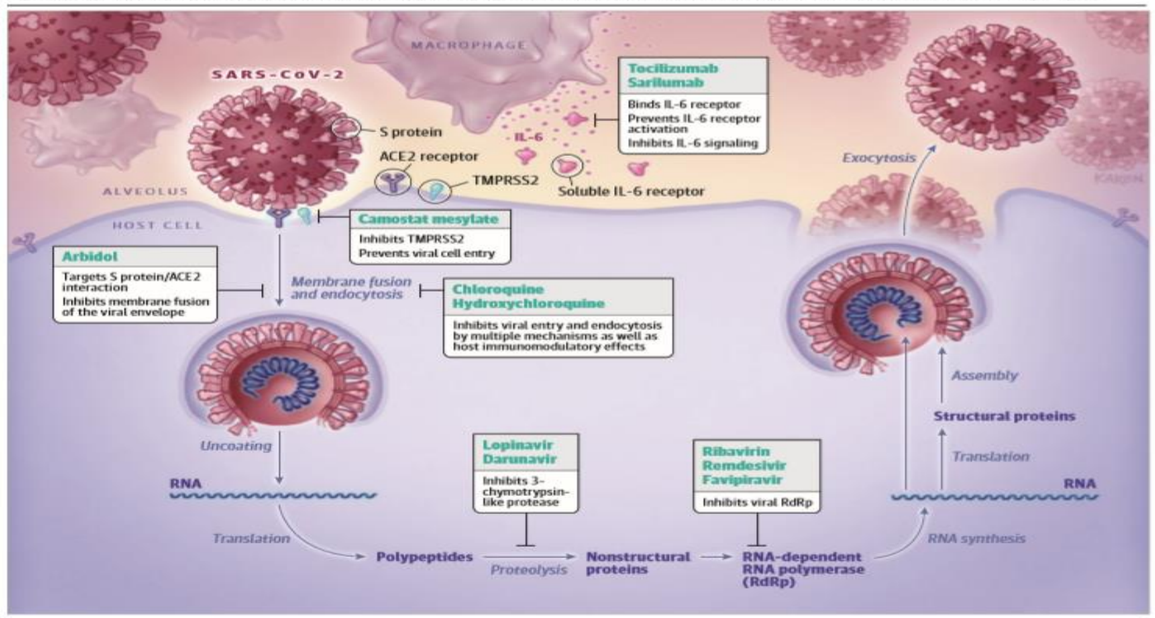
Corticosteroids

- The efficacy of corticosteroids in ARDS and septic shock more generally remains debated.

Anticytokine or Immunomodulatory Agents

- Tocilizumab, Monoclonal antibodies agent showed clinical improvement with covid19 patient , still further studies needed to determine efficacy.
- Others : Sarilumab, bevacizumab eculizumab .

Figure. Simplified Representation of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Viral Lifecycle and Potential Drug Targets



Schematic represents virus-induced host immune system response and viral processing within target cells. Proposed targets of select repurposed and investigational products are noted. ACE2, angiotensin-converting enzyme 2; S protein, spike protein; and TMPRSS2, type 2 transmembrane serine protease.

Immunoglobulin Therapy

- potential adjunctive therapy for COVID-19 is the use of **convalescent plasma** or **hyperimmune immunoglobulins.** The rationale for this treatment is that antibodies from recovered patients may help with both free virus and infected cell immune clearance
- In theory, the benefits of this therapy would accrue primarily within **the first 7 to 10 days of infection**, when viremia is at its peak and the **primary immune response has not yet occurred**.
- On March 24, 2020, the **FDA released guidance for requesting an emergency investigational new drug application and screening donors for COVID-19 convalescent plasma**

Treatment

Article: **Pharmacologic Treatments for Coronavirus Disease 2019 (COVID-19)** A Review
Published: Cont.,
Summary:

Current recommendation

The current Centers for Disease Control and Prevention guidance of March 13, 2020	**World Health Organization (WHO) clinical management guidance** of March 7, 2020
No specific treatment for COVID-19 is available	No current evidence to recommend any specific anti-COVID-19 treatment for patients with confirmed COVID-19
Emphasizes that management should include prompt implementation of recommended infection prevention and control measures and supportive management of complications.	Emphasizes the role of supportive care based on severity of illness, ranging from symptomatic treatment for mild disease to evidence-based ventilatory management for ARDS and early recognition and treatment of bacterial infections and sepsis in critically ill patients
Corticosteroids should be avoided unless indicated for other reasons.	Not routinely give systemic corticosteroids for treatment of viral pneumonia outside clinical trials” and state “investigational anti-COVID-19 therapeutics should be used only in approved, randomized, controlled trials
Remdesivir, are mentioned as options through either compassionate use or ongoing clinical trials.	WHO recently announced plans to launch a global “**megatrial” called SOLIDARITY** with a pragmatic trial design that will randomize confirmed cases into either standard care or 1 of 4 active treatment arms (remdesivir, chloroquine or hydroxychloroquine, lopinavir/ritonavir, or lopinavir/ritonavir plus interferon-β) based on local drug availability.