



Scientific Research Monitoring on COVID-19

03 March 2020

Reported by: *(Public Health Research Section)*

WHAT WE KNOW SO FAR



1. 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.
2. New designation for the disease and the virus: **COVID-19** and **SARS-COV2** .
3. Transmission from human to human has been confirmed. Incubation period ranges from 3–7 days and can reach up to 14 days. Transmission during the incubation period is not yet confirmed (further studies are required).
4. Suggested human-to-human transmission occurs through droplets, contact and fomites, similar to Severe Acute Respiratory Syndrome (SARS).
5. Efforts currently in developing therapies for this virus focus on previously known medications and vaccination for MERS-CoV and SARS-CoV.
6. Most studies mention multiple antiviral medications are involved but treatment outcomes are yet to be published. One study in the US reported recovery after 1 day of treatment with Remdesivir. **Trial on animals have shown multiple drug candidates to be effective. Trials in humans are ongoing.**



WHAT WE KNOW SO FAR

7. WHO forum held 11-12 Feb 2020 to mobilize research on COVID19 vaccinations and therapies.
8. WHO issued a response budget for three month starting from February 2020.
9. Human coronavirus remains on inanimate surfaces such as metal or glass for up to 9 days, but can be efficiently inactivated by disinfection, suggesting that effects on SARS-CoV2 could be similar.
10. 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.
11. Isolation is the best measure to control transmission. The epidemic is expected to peak in early March 2020.
12. Transmission of SARS occurs most often when a patient develops sever symptoms, which make it easier to contain an outbreak. But with COVID-19/ SARS-CoV2, a patient can present with mild symptoms and still have the potential to spread the disease.



WHAT WE KNOW SO FAR:

13. Children have mild symptoms compared with adults. **Further studies of this population is needed.**
14. 80% of infected patients have mild symptoms and 1.2% may present without symptoms.
15. People with mild disease, recovery time is about two weeks, while people with severe or critical disease recover within 3 to 6 weeks.



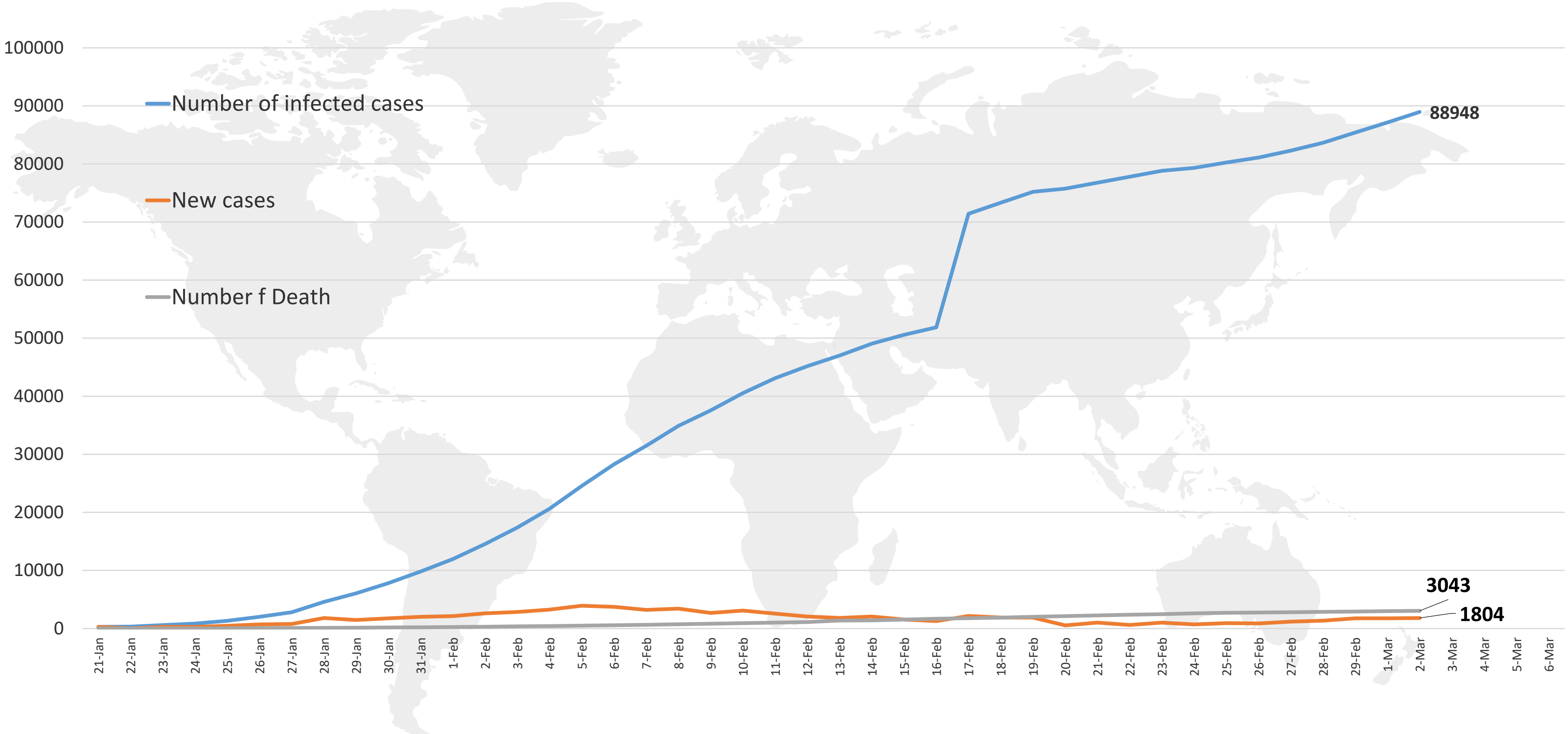
NEW UPDATES FROM TODAY'S REPORT:

- **Epidemiology section:** WHO mission is sent to Iran to manage and support the COVID19 situation.
- **Clinical feature and transmission section:** clinical feature of 24 asymptomatic (presented without symptoms) have a period of communicability up to 3 weeks.
- **Treatment:** scientific opinion on ECMO and updates of Medical trials for COVID19.
- **Miscellanies:** the role of the artificial intelligence in out break response



EPIDEMIOLOGY:

Figure 1: Total number of infected, new, and death cases (January 24st to March 2nd, 2020)



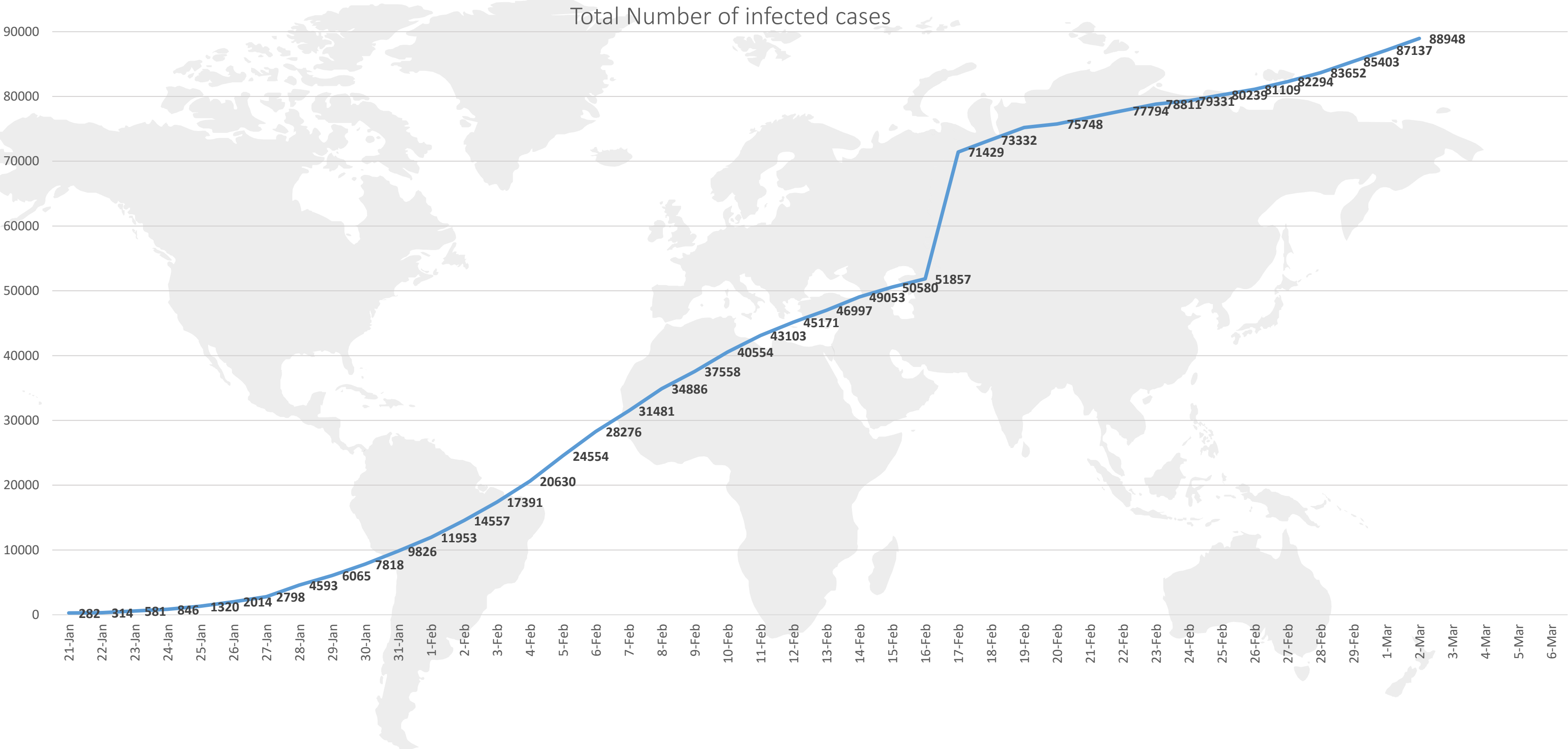
Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](#)



EPIDEMIOLOGY:

Figure 2: Number of infected cases (January 21st to March 2nd, 2020)



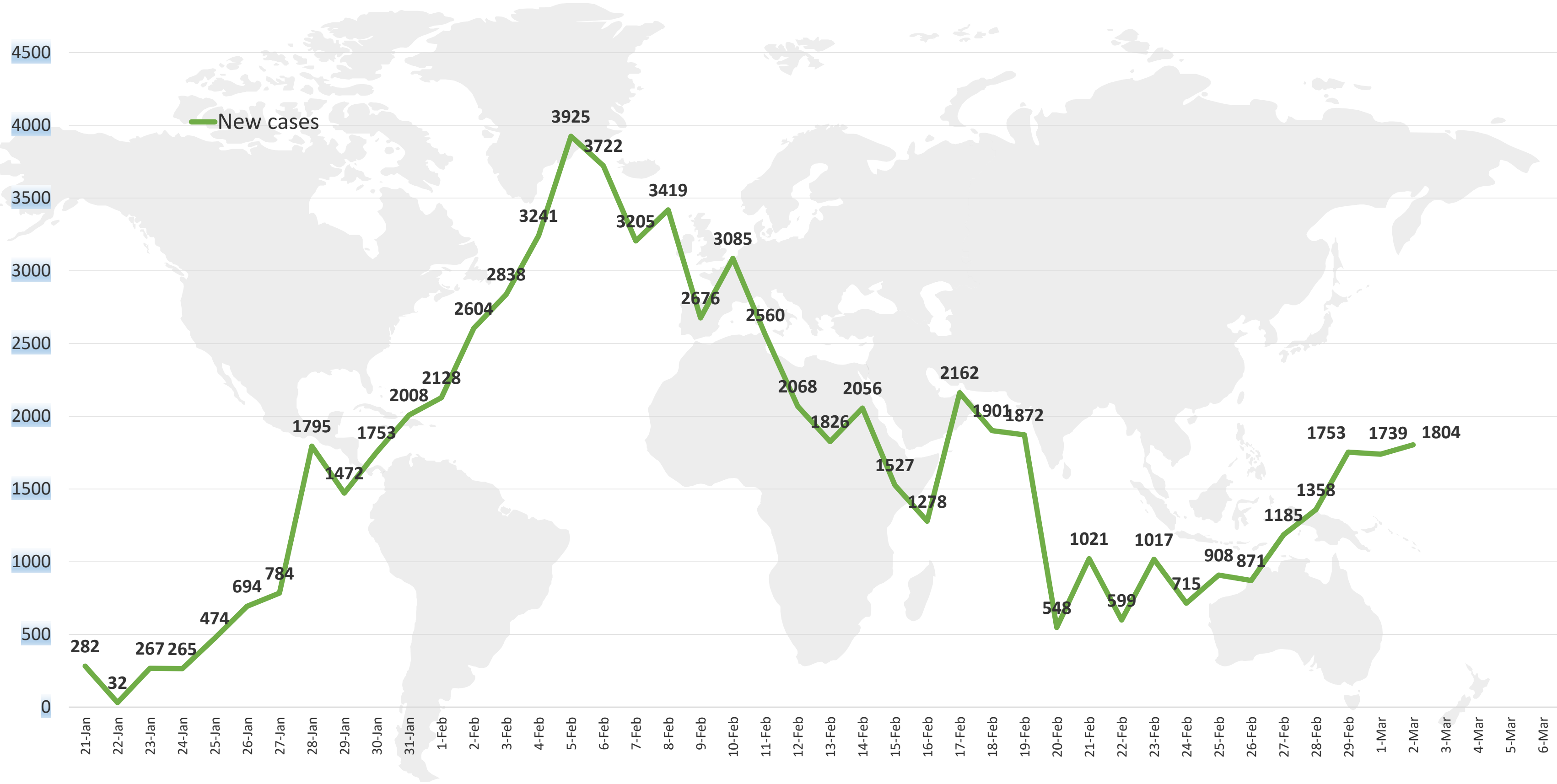
Line graph published by Abu Dhabi Public Health Center 2020.

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



EPIDEMIOLOGY:

Figure 3: Number of new cases (January 21st to March 2nd, 2020)



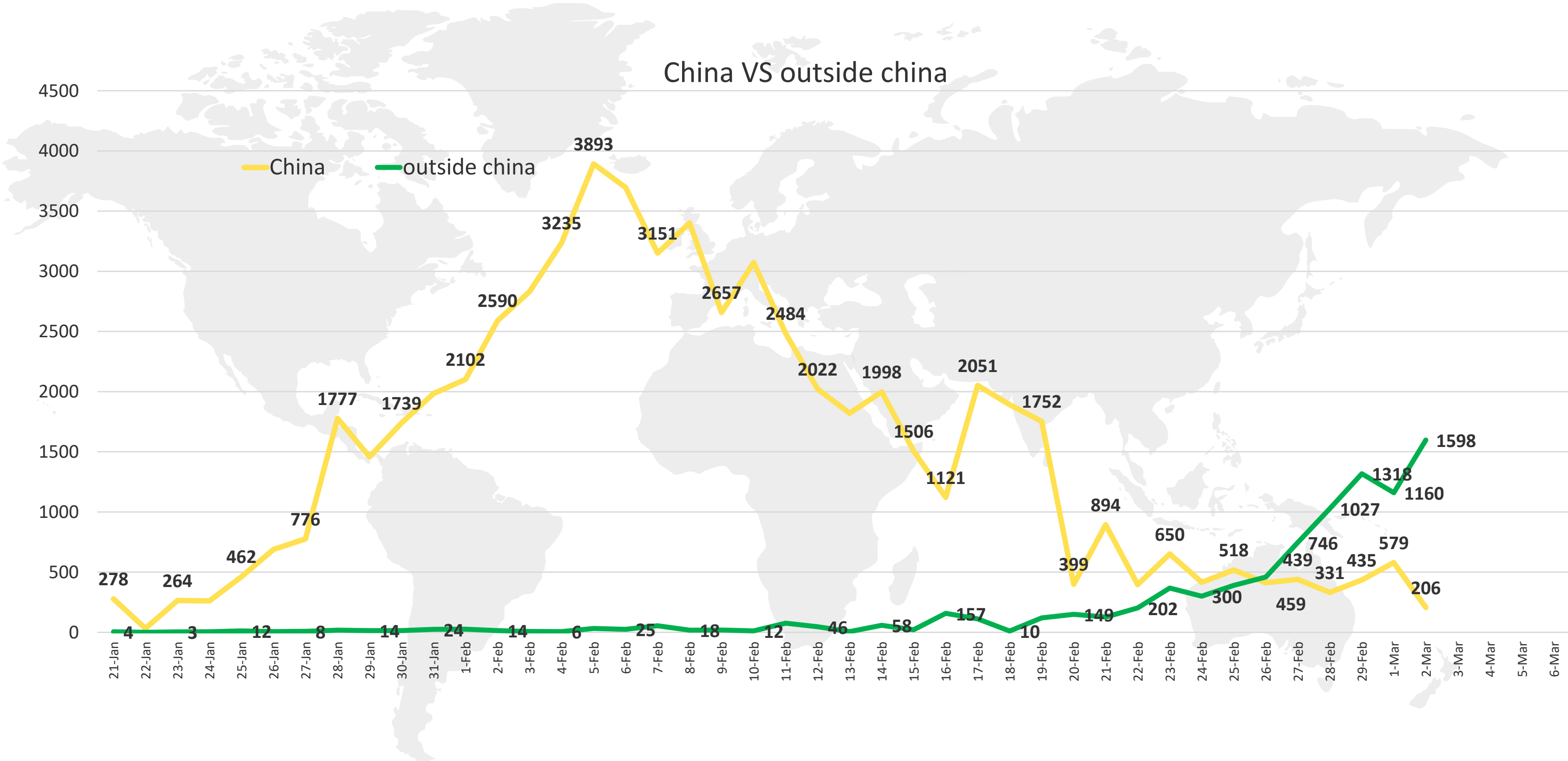
Line graph published by Abu Dhabi Public Health Center 2020.

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



EPIDEMIOLOGY:

Figure 4: Number of new cases in China versus outside China (January 21st to March 2nd, 2020)



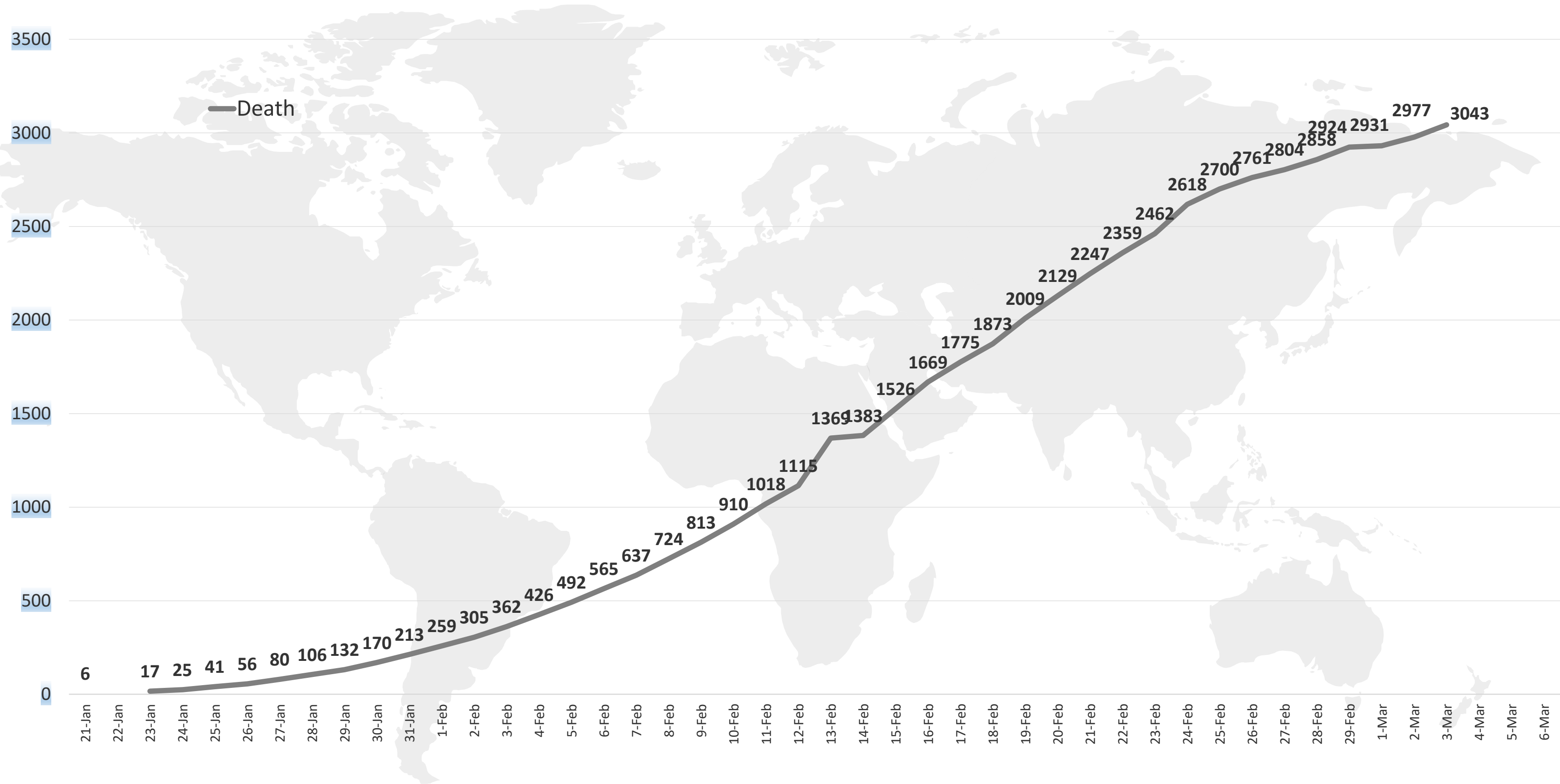
Line graph published by Abu Dhabi Public Health Center 2020.

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



EPIDEMIOLOGY:

Figure 5: Number of total deaths (January 21st to March 2nd, 2020)



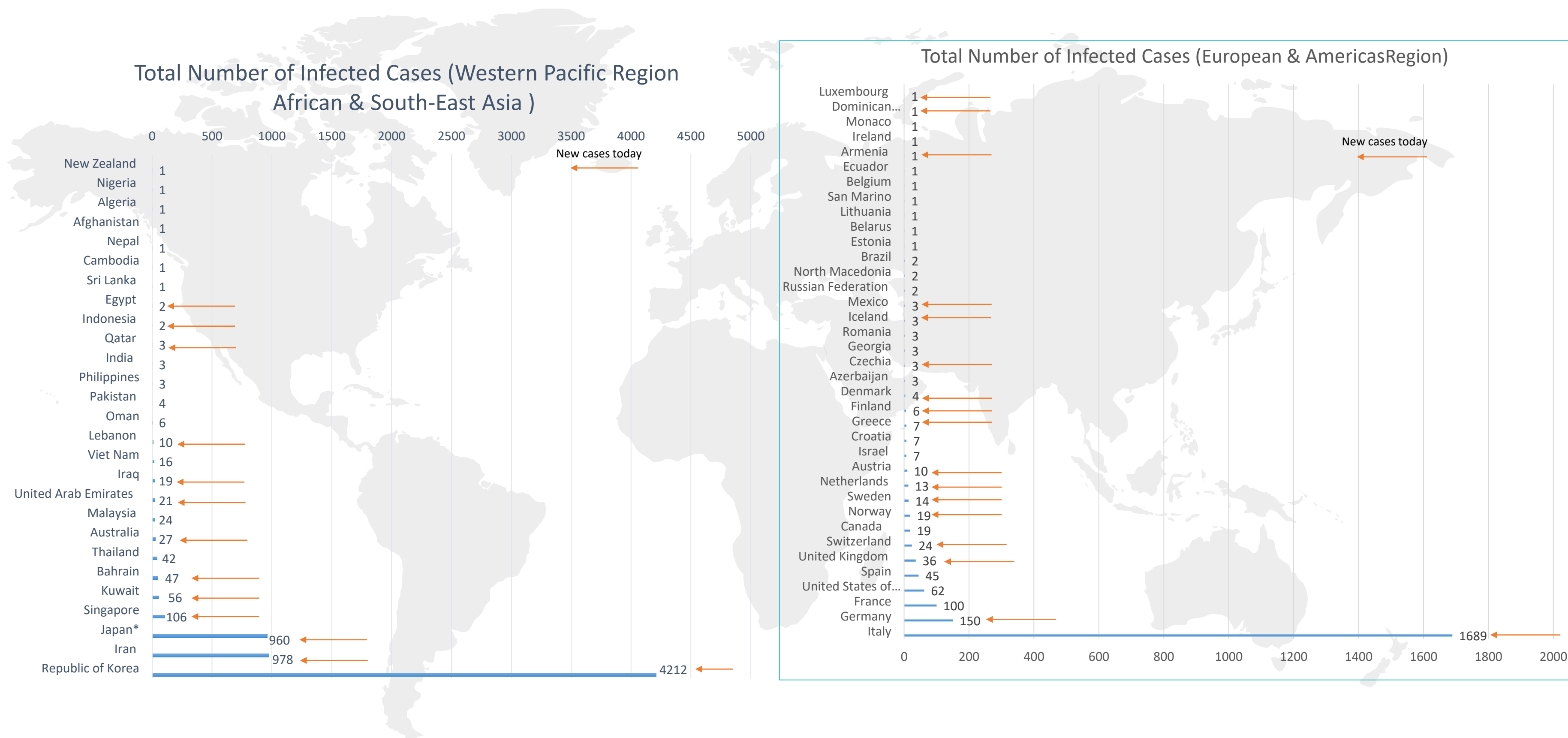
Line graph published by Abu Dhabi Public Health Center 2020.

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



EPIDEMIOLOGY:

Figure 6: Total number of cases outside China per country (January 21st to March 2nd , 2020)



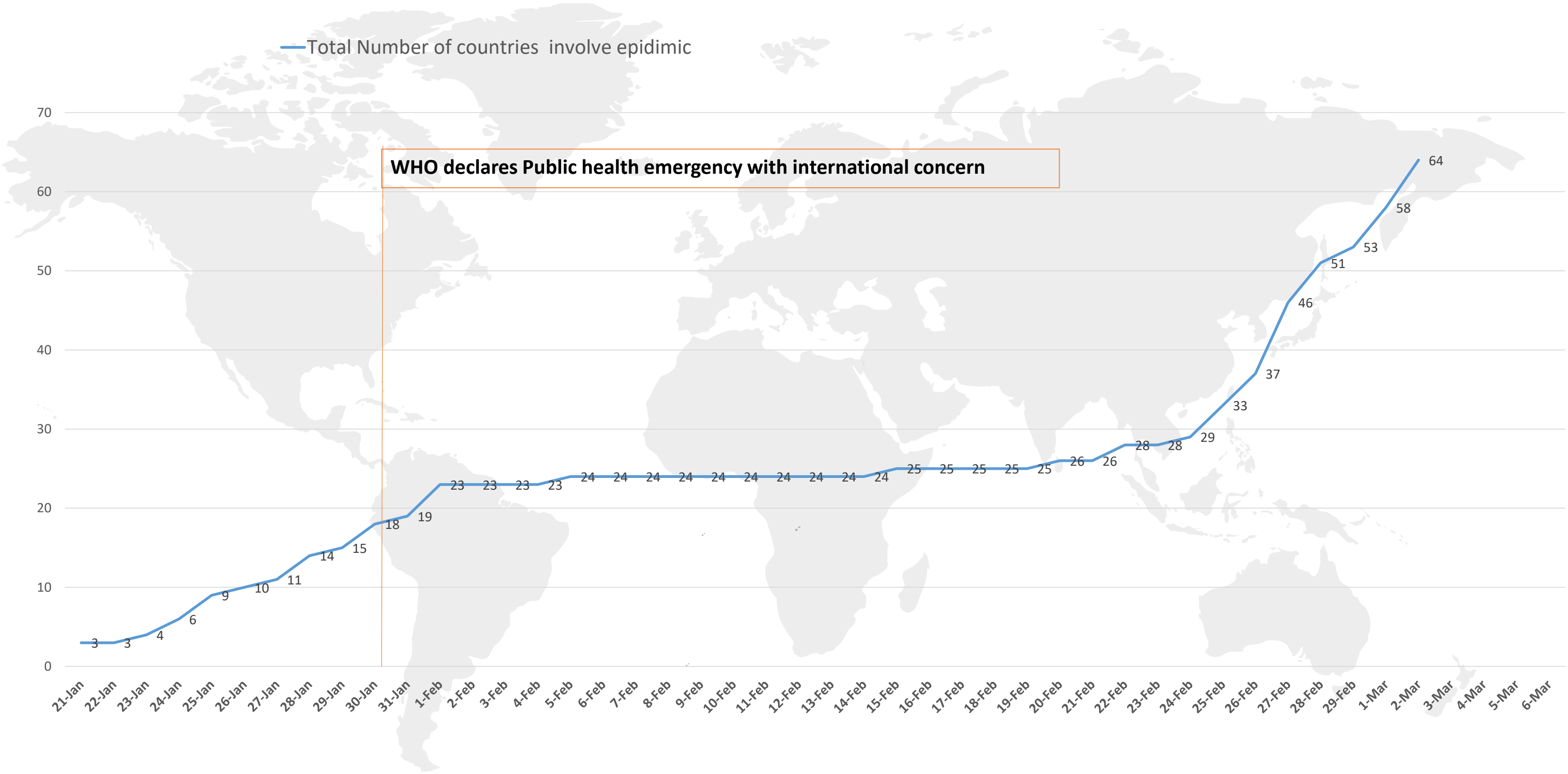
Line graph published by Abu Dhabi Public Health Center 2020.

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



EPIDEMIOLOGY:

Figure 7: Total number of countries reporting cases of COVID-19 outside China over time



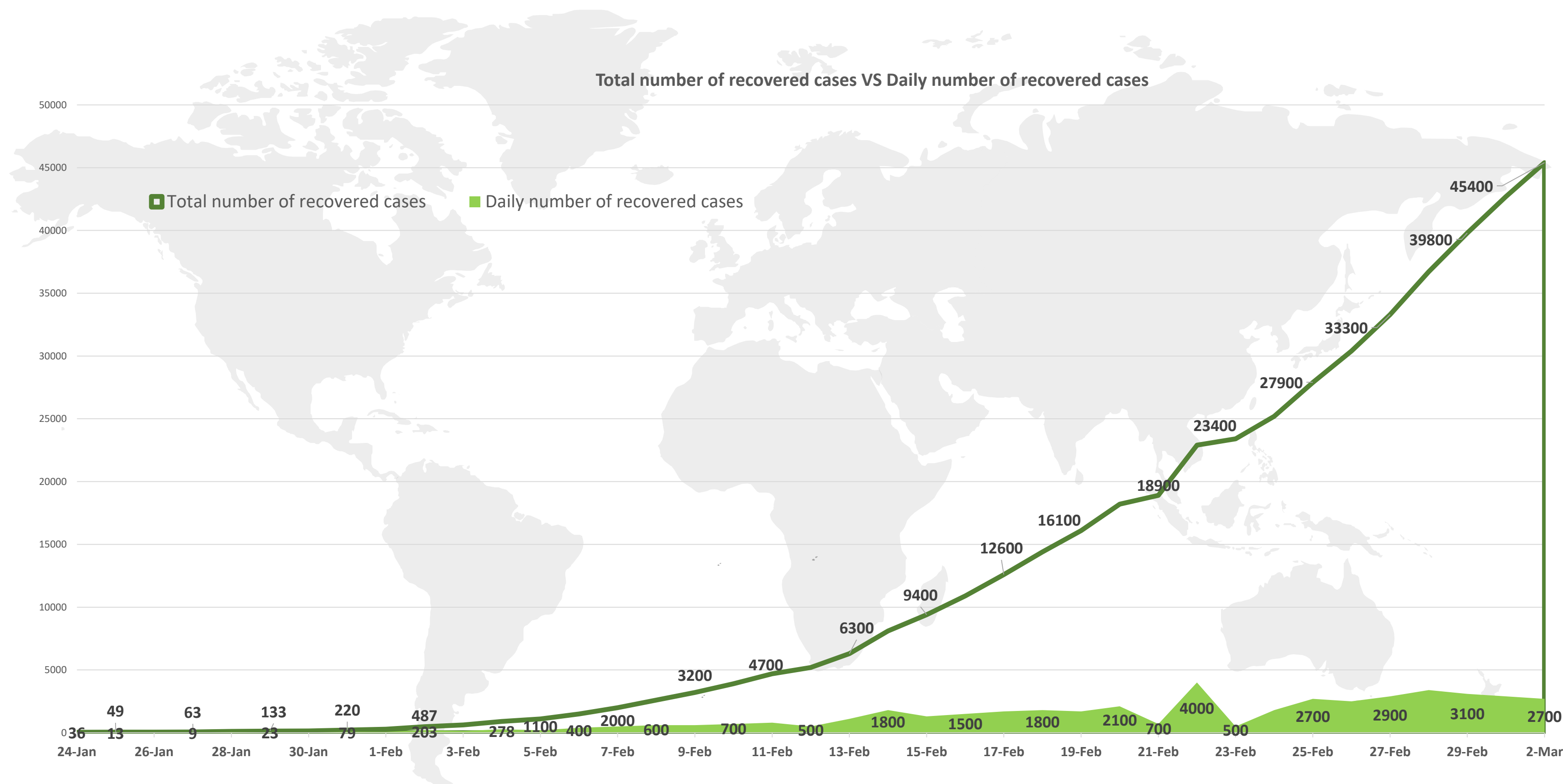
Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](#)



EPIDEMIOLOGY:

Figure 8: Total recovered cases of COVID-19. (January 24st to March 2nd, 2020)



Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: [John Hopkins University](https://www.jhu.edu/)

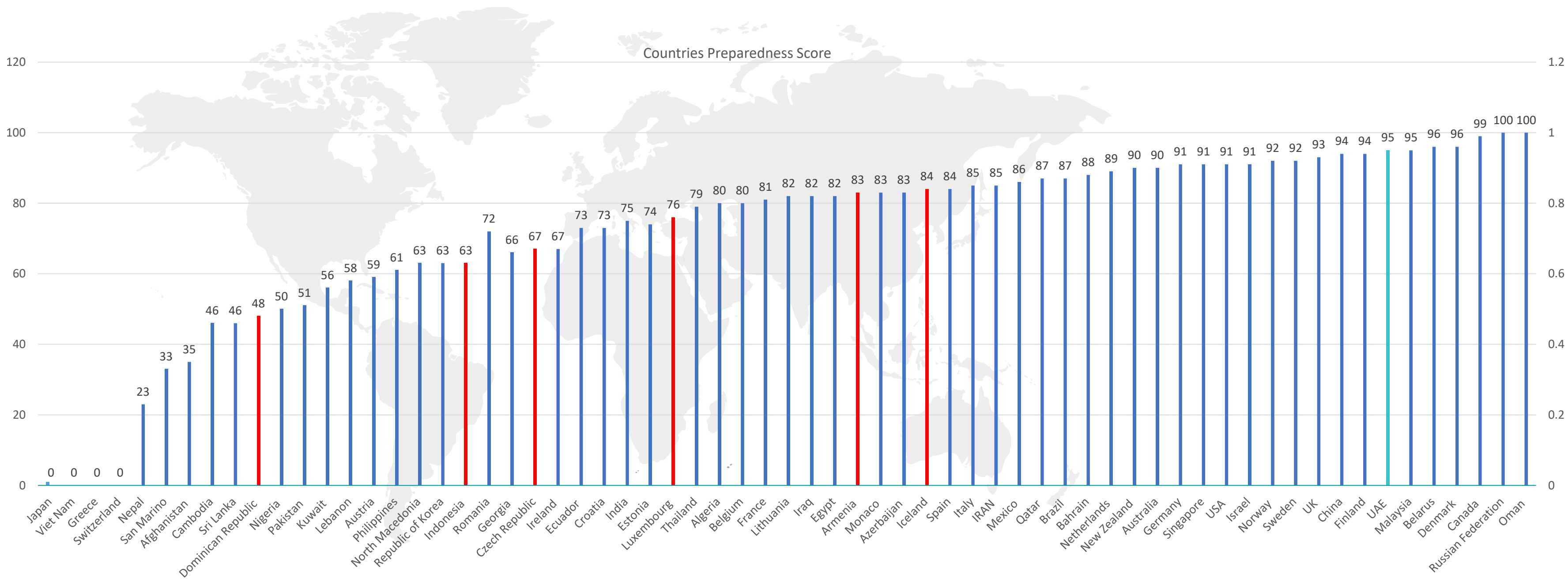
Retrieved at



EPIDEMIOLOGY:

Figure 9 : Capacities of countries reporting COVID19 cases

Figure 9A: Countries' preparedness score in responding to Public health risks and acute events. Published in 2018



Line graph published by Abu Dhabi Public Health Center 2020.

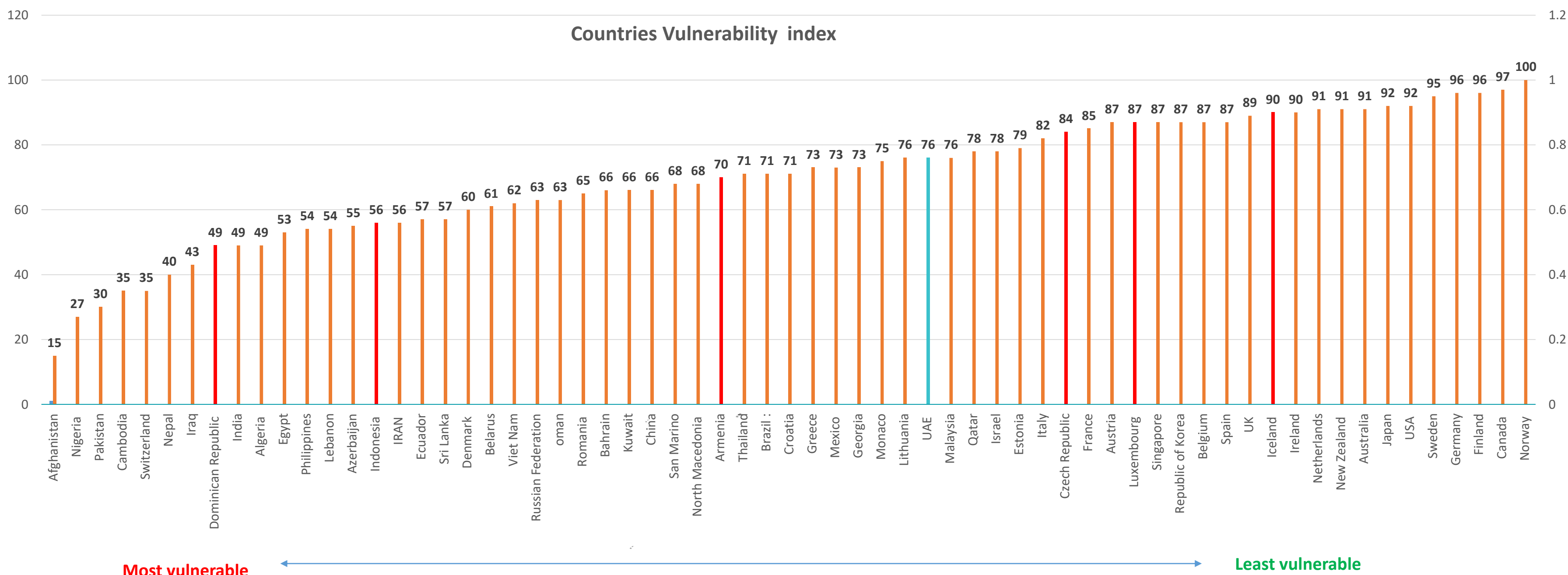
Data resources : [SPAR score](#) , [IDVI score](#)



EPIDEMIOLOGY:

Figure 10 : Capacities of countries reporting COVID19 cases

Figure 9B: Countries' vulnerability index to spread infectious disease. Published in 2016



Most vulnerable

Least vulnerable

Line graph published by Abu Dhabi Public Health Center 2020.

Data resources : [SPAR score](#) , [IDVI score](#)

EPIDEMIOLOGY:



WHO report 02/03/2020 important points :

- Six new Member States (Armenia, Czechia, Dominican Republic, Luxembourg, Iceland, and Indonesia) reported cases of COVID-19 in the past 24 hours.
- A team of WHO experts has arrived in Tehran, Iran to support the COVID-19 response. The objectives are to identify transmission dynamics and at-risk populations and provide technical guidance.
 - The mission objective : identify transmission dynamics and at-risk populations; provide guidance on strengthening and scaling up the response to the ongoing outbreak, including agreement on priority control measures; and provide guidance on strengthened readiness for areas not yet affected by the outbreak.
 - The plane carrying the technical **team members** also contained a **shipment of medical supplies and protective equipment to support over 15,000** health care workers, as well as enough **laboratory kits enough to test and diagnose nearly 100,000 people.**
 - **WHO expresses its sincere gratitude** to the Government of the **United Arab Emirates** for providing the **chartered plane** that enabled WHO to successfully allow its team and **medical supplies to travel to the Islamic Republic of Iran.**
- WHO's Operations Supply and Logistics team are working across numerous areas to support the COVID-19 response. Activities include working to establish a **Supply Chain Coordination Cell** and providing a technical **briefing for G20 members** on the personal **protective equipment (PPE) market situation.**



CLINICAL FEATURES AND TRANSMISSION



Article :Clinical Characteristics of 24 Asymptomatic Infections with COVID-19 Screened among Close Contacts in Nanjing, China (1/2)

Published : 28 February 2020

Summery: Number of cases: 24

- **Cases collected** during the period (Jan 28- Feb 9 2020).
- The study describe the clinical characteristics of 24 cases with **asymptomatic infection** screened from close contacts* and to show the transmission potential of asymptomatic COVID-19 virus carriers .
- **Clinical findings:**
 - None has symptoms before the positive PCR test.
 - Five cases (20.8%) developed symptoms (fever, cough, fatigue and etc.) during hospitalization , 29% had no symptoms during hospitalization.
 - Age ranging from 5 to 95 years old
- **Laboratory assessments:** (as in the table and its not significant)

*Close contacts were defined as:

- 1) cohabiting family members of the COVID-19 patient or suspected patient.
- 2) individuals who were exposed to the COVID-19 patient **within 2 meters for more than 1 hour within 2 days** before the symptom onset of the patient.

Link : [here](#)

Note : This is paper is not yet peer-reviewed , therefore, it should not be used for clinical decision making or reporting of research to a lay audience.

Table S1. Clinical characteristics of 24 asymptomatic infections with COVID-19 grouped by cases with/without symptoms after diagnosis.

Clinical characteristics	All cases (n = 24)	Cases with symptoms after diagnosis (n = 5)	Cases without symptoms after diagnosis (n = 19)	P
Age, Median (IQR), yrs	32.5 (19.0 - 57.0)	53.0 (23.0 - 65.0)	32.0 (15.0 - 57.0)	0.594
Age groups, No. (%)				
0-14 yrs	5 (20.8)	1 (20.0)	4 (21.1)	0.605
15-49 yrs	10 (41.7)	1 (20.0)	9 (47.3)	
50-64 yrs	4 (16.7)	1 (20.0)	3 (15.8)	
≥ 65 yrs	5 (20.8)	2 (40.0)	3 (15.8)	
Male sex, No. (%)	8 (33.3)	0 (0)	8 (42.1)	0.130
Supportive treatment, No. (%)				
antiviral medications	21 (87.5)	5 (100.0)	16 (84.2)	1
interferon atomization,	24 (100.0)	5 (100.0)	19 (100.0)	-
antibiotics,	1 (4.2)	0 (0)	1 (5.3)	1
antifungal medications,	1 (4.2)	0 (0)	1 (5.3)	1
systemic corticosteroids,	0 (0)	0 (0)	0 (0)	-
intravenous immunoglobulin,	3 (12.5)	2 (40.0)	1 (5.3)	0.099
Mechanical ventilation,	0 (0)	0 (0)	0 (0)	-
Intensive care unit admission, No. (%)	0 (0)	0 (0)	0 (0)	-
Communicable period (first time of SARS-CoV-2 positive to date of virus clearance), Median (IQR), days	9.5 (3.5 - 13.0)	12.0 (12.0 - 14.0)	6.0 (2.0 - 12.0)	0.0586
Virus clearance	18 (75.0)	4 (80.0)	14 (73.7)	1
Laboratory findings on admission				
SaO2 < 95%, No. (%)	0 (0)	0 (0)	0 (0)	-
Blood leukocyte count				
>10 * 10 ⁹ /L	0 (0)	0 (0)	0 (0)	-
<4 * 10 ⁹ /L	4 (16.7)	2 (40.0)	2 (10.5)	0.179
low Lymphocyte count	4 (16.7)	2 (40.0)	2 (10.5)	0.179
Haemoglobin level	132.0 (120.0 - 144.0)	124.0 (123.0 - 129.0)	134.5 (120.0 - 152.0)	0.180
high CRP	4/23 (17.4)	2/5 (40.0)	2/18 (11.1)	0.194
Procalcitonin level	5/24 (20.8)	1/5 (20.0)	4/19 (21.1)	1.000
high Lactose dehydrogenase	4/24 (16.7)	1/5 (20.0)	3/19 (15.8)	1.000
high Aspartate aminotransferase	0/24 (0)	0/5 (0)	0/19 (0)	-
high Alanine aminotransferase	2/24 (8.3)	0/5 (0)	2/19 (10.5)	1.000
high Total bilirubin	0/24 (0)	0/5 (0)	0/19 (0)	-
high Creatinine	2/24 (8.3)	0/5 (0)	2/19 (10.5)	1.000
high D-dimer	4/22 (18.2)	1/5 (20.0)	3/17 (17.7)	1.000
Sodium – mmol/liter	0/23 (0)	0/5 (0)	0/18 (0)	-
Potassium – mmol/liter	1/23 (4.4)	1/5 (20.0)	0/18 (0)	0.217



CLINICAL FEATURES AND TRANSMISSION

ABU DHABI PUBLIC
HEALTH CENTRE

مركز أبوظبي
للصحة العامة



Article : Clinical Characteristics of 24 Asymptomatic Infections with COVID-19 Screened among Close Contacts in Nanjing, China (2/2)

- **Radiographic finding:** Chest CT scans: 50.0% cases showed typical CT images finding
- The remaining 29.2% cases showed normal CT image
- **Cases whom have no symptoms or CT finding were younger (median age 14)**
- **Outcomes:**
 - None of the 24 cases developed severe COVID-19 pneumonia or died.
 - As of Feb 18, 2020, a total of 18 cases had the virus cleared. (*2 continuous negatives of nucleic acid tests*) among whom 9 cases were discharged from the hospital while the rest 9 were kept in hospital for further observation.
 - **Six cases had nucleic acid tests reversed to positive after one negative result**
- **The median communicable period** (defined as the interval from the first day of positive nucleic acid tests to the first day of continuous negative tests**) **was 9.5 days (up to 21 days among the 24 asymptomatic cases).**
- **Incubation period (8 days)**
- Some of the asymptomatic patient transmitted disease to family members **and caused severe COVID-19 pneumonia.**
- **Conclusion:**
 - The asymptomatic carriers identified from close contacts were prone to be mildly ill during hospitalization. However, **the communicable period** could be up to **three weeks** and **the communicated patients** could develop **severe illness.**
 - **Isolation and multiple virus nucleic acid detections** are also recommended for discharged **COVID-19 patients**
 - Case 13, an asymptomatic COVID-19 carriers traveled in 19 Jan 2020 in Wuhun infected 3 members of his family , after contact tracing he **remain positive for PCR till 18 Feb. 2020** (*indicate which indicated that the communicable period could be as long as 29 days*)!

*Pharyngeal swab specimens were collected on admission day and every other day thereafter for the COVID-19 virus test.



TREATMENT



Article 1: Preparing for the Most Critically Ill Patients With COVID-19 The Potential Role of Extracorporeal Membrane Oxygenation

Published: February 19, 2020

Summary:

- The WHO interim guidelines made general recommendations for treatment of ARDS in this setting, including that consideration be given to referring patients with **refractory hypoxemia** to expert centers capable of providing **extracorporeal membrane oxygenation (ECMO)**.
- ECMO is a form of modified cardiopulmonary bypass in which venous blood is removed from the body and pumped through an artificial membrane lung in patients who have refractory respiratory or cardiac failure. Oxygen is added, carbon dioxide is removed, and blood is returned to the patient, either via another vein to provide respiratory support or a major artery to provide circulatory support.
- There is **evidence that it reduces mortality in highly complicated cases**. However, **it only supports lungs and heart hence, it is limited** in treating other causes of death associated with COVID-19 such multi-organ failure.
- **Challenge:** Lack of ECMO consoles or disposable equipment as it is expensive, suitably trained staff, or isolation rooms with the requisite infrastructure. Many materials necessary to make ECMO circuitry are manufactured in China and it is conceivable that the outbreak may disrupt supply chains.

[Link: here](#)



TREATMENT



Article 2: Clinical trial analysis of 2019-nCoV therapy registered in China (1/2)

Published: 28 February 2020

Summary:

- The study analyzes all china clinical trials therapy for 2019-nCoV.
- it revealed that there is no effective drug for the new coronavirus pneumonia yet.
- Proposed candidate are **antiviral drugs, antimalarial drugs, glucocorticoids, plasma therapy, virus vaccine and traditional Chinese medicine.** However, the effects of these drugs were limited to clinical improvement and nucleic acid inhibition .
- Most of the clinical trails usually will take about over one year to be completed.
- However, there are more than **twenty studies that** will be completed within **six months.** Some important drugs such as **Remdesivir, ASC09, Lopinavir, Ritonavir, Chloroquine and glucocorticoids** might be completed within **four months.**

[Link : Here](#)

Table 1 describes the drug trial for covid19 by the neared end date

Drug of Interest	Study Time	Primary Endpoint
Remdesivir	Ends 27 April 2020	Clinical improvement
Chloroquine	Ends 17 March 2020	Mortality rate in critically ill patient
Favipiravir, and interferon alpha	Ends 24 April 2020	RNA negativity, rate of liver and kidney injury
ASC09/Ritonavir versus Lopinavir/Ritonavir	Ends 31 May 2020	Adverse outcome
Low dose corticosteroid	End 14 April 2020	CT , complications , vital signs
Tocilizumab	Ends 10 May 2020	
ASC09F and arbidol	Ends 1 May 2020	Clinical improvement
ASC09F and ritonavir	Ends 1 July 2020	Adverse outcome

For further information on all the current drugs please visit the article link

Note that the priority agent according to the WHO report on 1st of March 2020 priority agents such as ritonavir/lopinavir and remdesivir.



TREATMENT



Article 2: Clinical trial analysis of 2019-nCoV therapy registered in China (2/2)

Link : [Here](#)

FIGURE 1. The location distribution for clinical trial of 2019-nCoV.

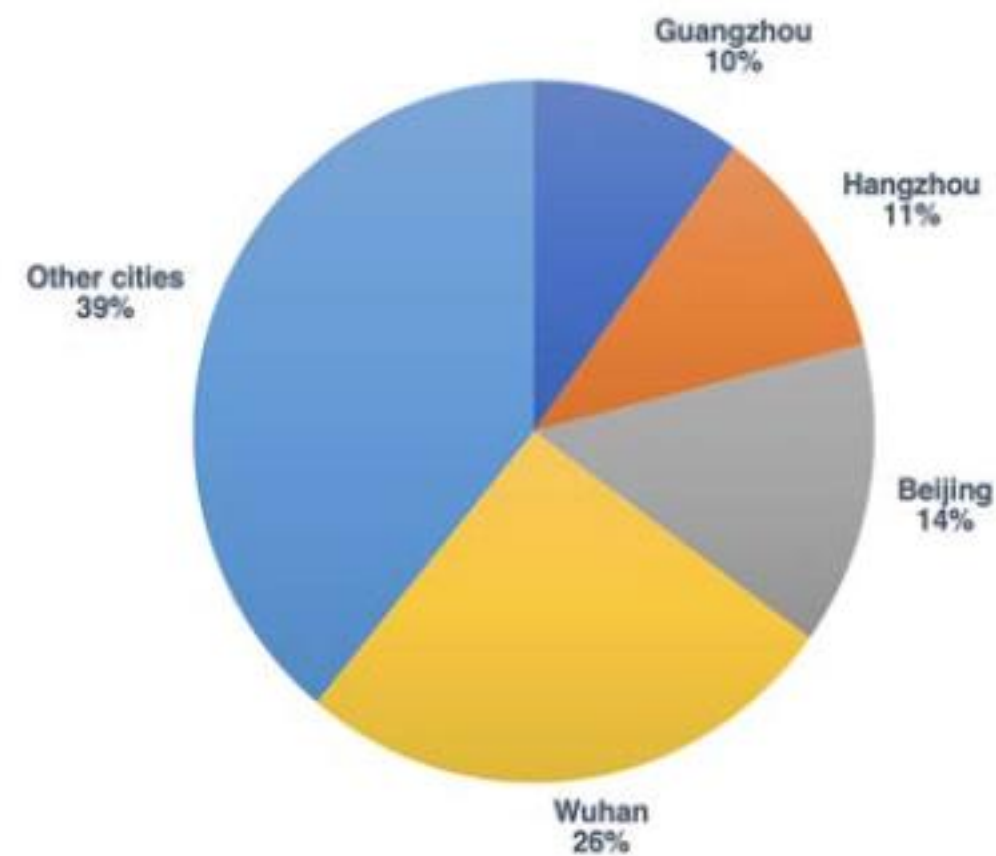
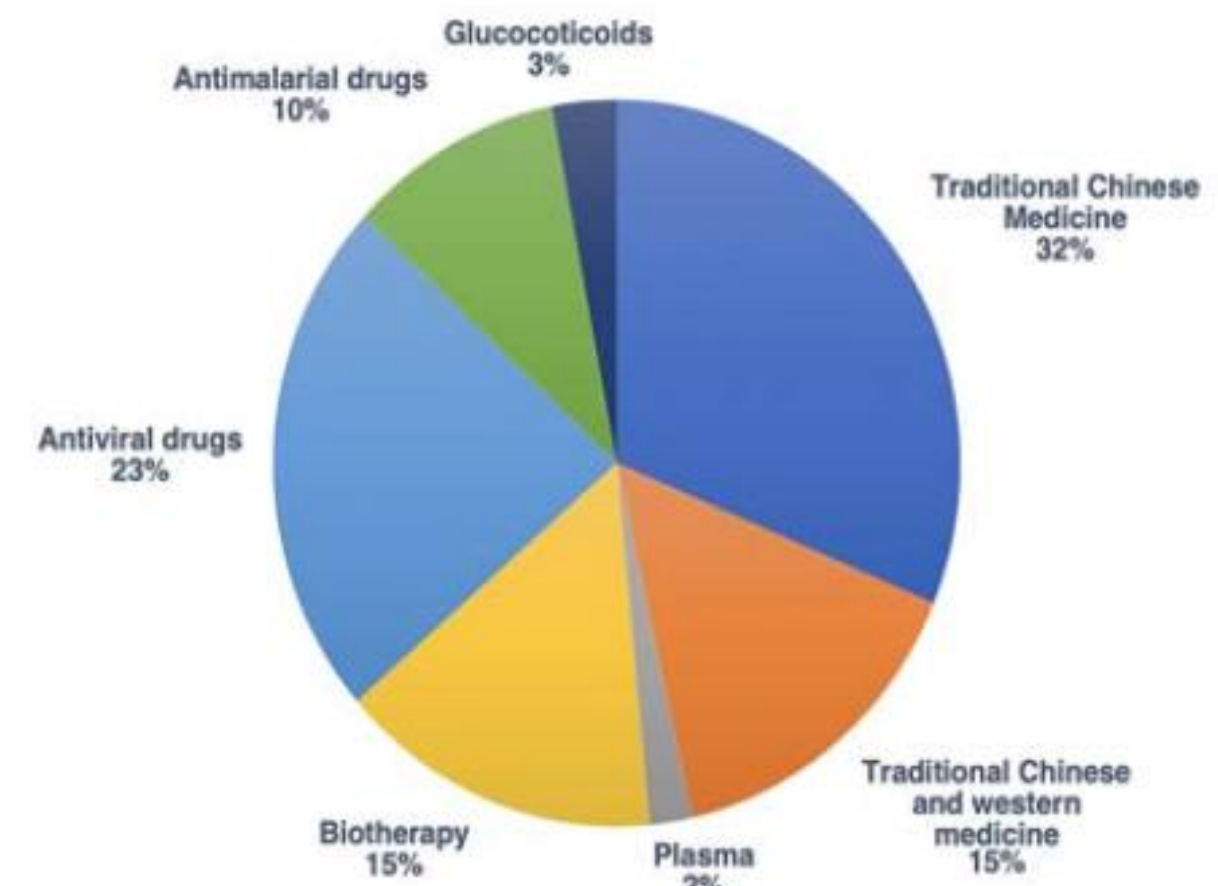


FIGURE 2. The classification of experimental drugs for 2019-nCoV.



Note : This is paper is not yet peer-reviewed , therefore, it should not be used for clinical decision making or reporting of research to a lay audience.



MISCELLANIES



Article 1: COVID-19 and artificial intelligence: protecting health-care workers and curbing the spread

Published: 20 February 2020

Summary: The article mentions some of the initiatives to face the COVID19 outbreak using AI. The articles emphasis that the use and effectiveness is still under question.

- **AI predict weather change and benefit of the spread:**
 - Historically in the Northern hemisphere, upper respiratory coronaviruses peak in the winter months and then decline. AI might help predict how warmer weather, come April and May, might have a beneficial effect on the spread.”
- **Health map tracking the spread:**
 - University of Oxford, Oxford, UK is involved with tracking the spread of COVID-19 as represented on the web-based platform, [Healthmap](#), which visually **represents global disease outbreaks according to location, time, and infectious disease agent.** “
- **AI tracking the spread in China :**
 - Used information in people movement using mobile payment app , social media , messages , webChat, data on travel around wuhan in machine learning model to predict the most likely location of where the COVID19 might arrive next. (**this will be informative on how to run border checks**).*
- **AI in diagnosis:**

[Infervision](#), a Beijing-based AI company uses its algorithm to spot COVID-19 on images of the lung as distinct from other respiratory infections. this will **expedite the diagnoses and monitoring of COVID-19.** *“(note : Application of this technology in COVID-19 has not yet been published in a peer-reviewed journal).*
- **In drugs:**
 - BenevolentAI and Imperial College London (report that a drug approved for rheumatoid arthritis, baricitinib, might be effective against the virus).
 - Insilico Medicine based in Hong Kong recently announced that its AI algorithms had designed six new molecules that could halt viral replication.

[Link : here](#)