



Scientific Research Monitoring on COVID-19

18 February 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 the virus originated in a bat reservoir.
2. 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 not yet confirmed (further study required).
3. Suggested human-to-human transmission occurs through droplets, contact and fomites, similar to Severe Acute Respiratory Syndrome (SARS).
4. Efforts currently in developing therapies for this virus focus on previously known medications and vaccination for MERS-Cov and SARS-Cov.
5. Most studies mention multiple antiviral medications are involved but treatment outcomes have yet to be published. One study in the US reported recovery after 1 day of treatment with Remdesivir.



WHAT WE KNOW SO FAR

6. WHO forum held 11-12 Feb 2020 to mobilize research on 2019-nCoV vaccination and therapies.
7. WHO issued a response budget for three month starting from February.
8. 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 nCoV could be similar.
9. Pregnant women infected with COVID-19 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.
10. New designation for the disease and the virus: COVID-19 and SARS-COV2
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, 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.



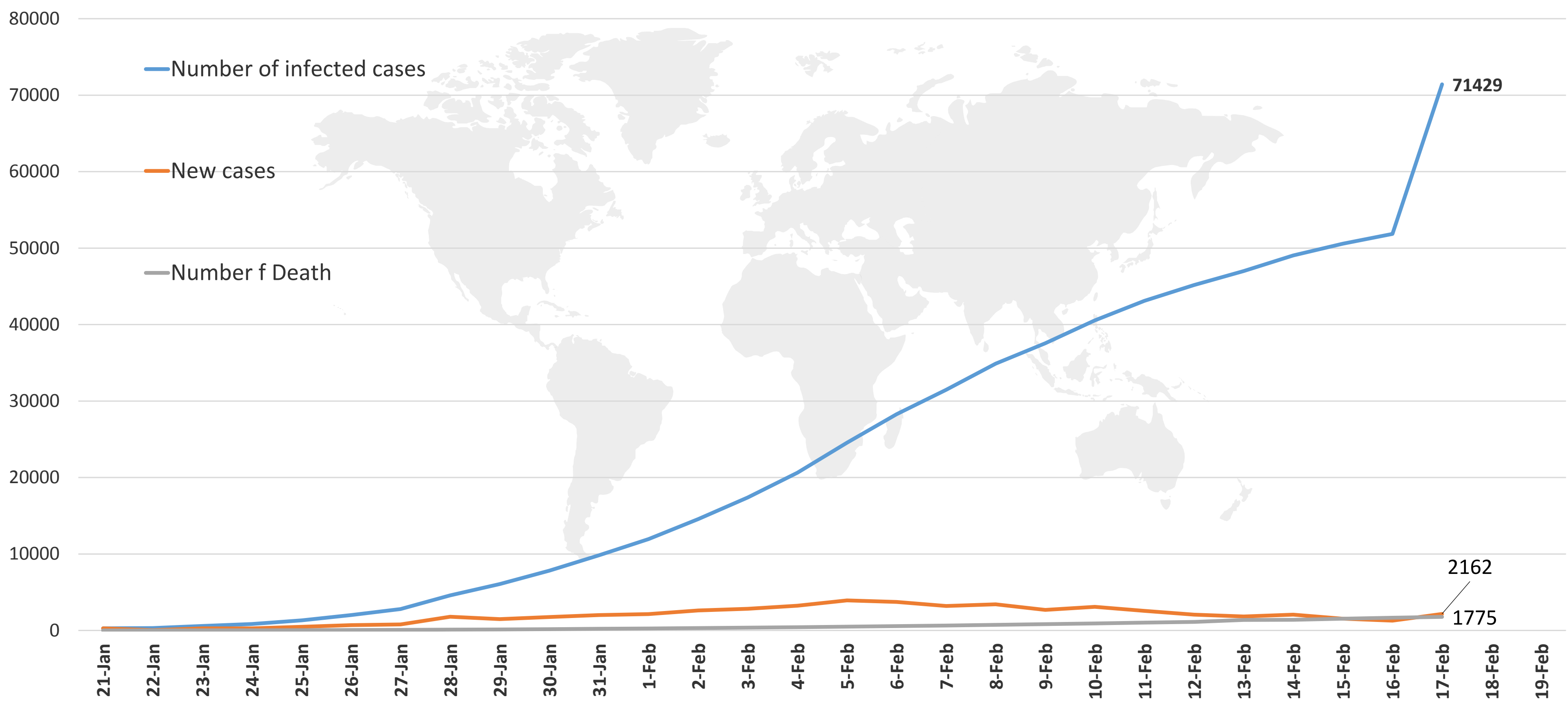
NEW UPDATES FROM TODAY'S REPORT:

- **Epidemiology section:** WHO is posting information about the Eastern Mediterranean region's action and preparedness.
- WHO developed a guidance on management of public health events at **points of entry** and **mass gathering**
- **Clinical feature and transmissibility:** COVID-19 in children is most often mild and can present with non-respiratory symptoms.



EPIDEMIOLOGY:

Figure 1: Total number of infected, new, and death cases (January 21 to February 17, 2020)



Line graph published by Abu Dhabi Public Health Center 2020.

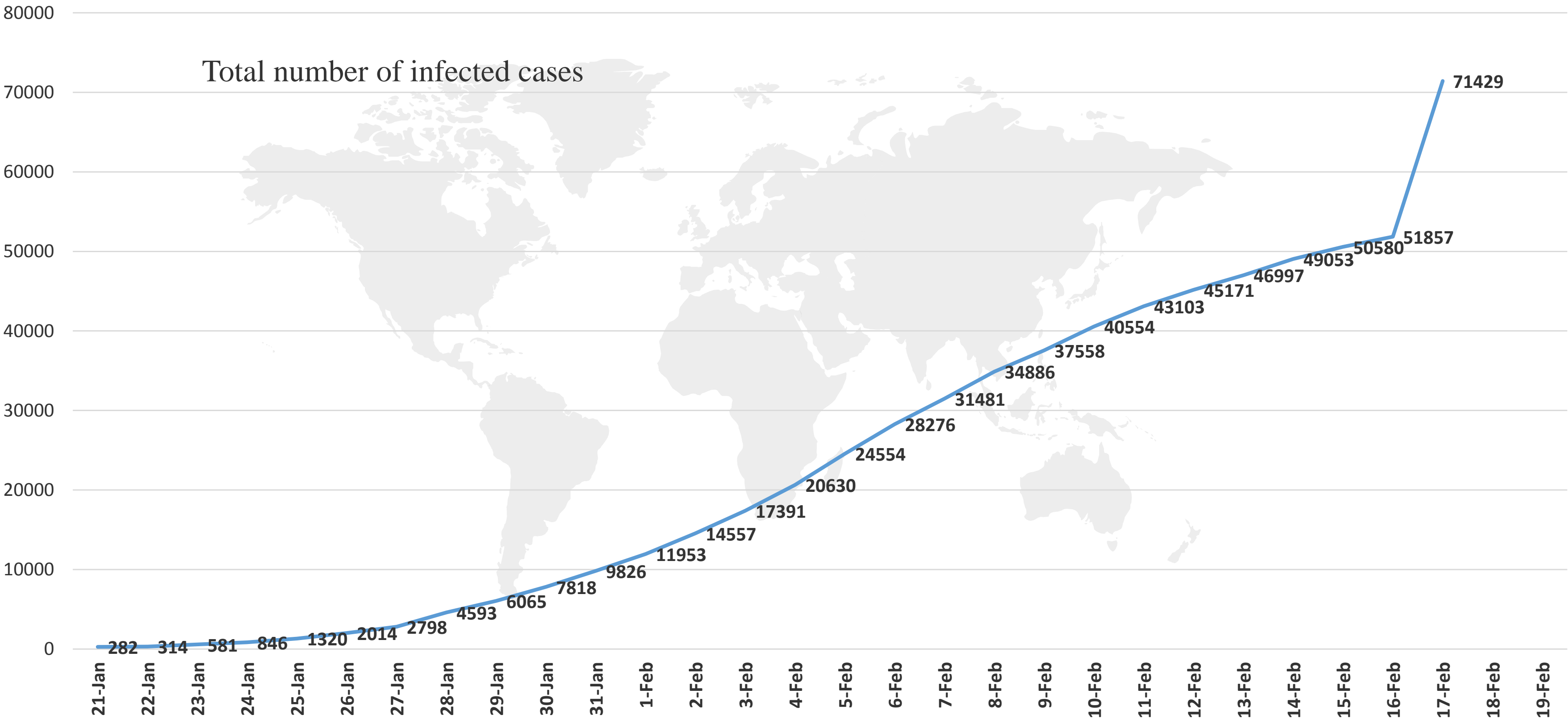
Data resource : [WHO](#)

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EPIDEMIOLOGY:

Figure 2: Number of infected cases (January 21 to February 17, 2020)



Line graph published by Abu Dhabi Public Health Center 2020.

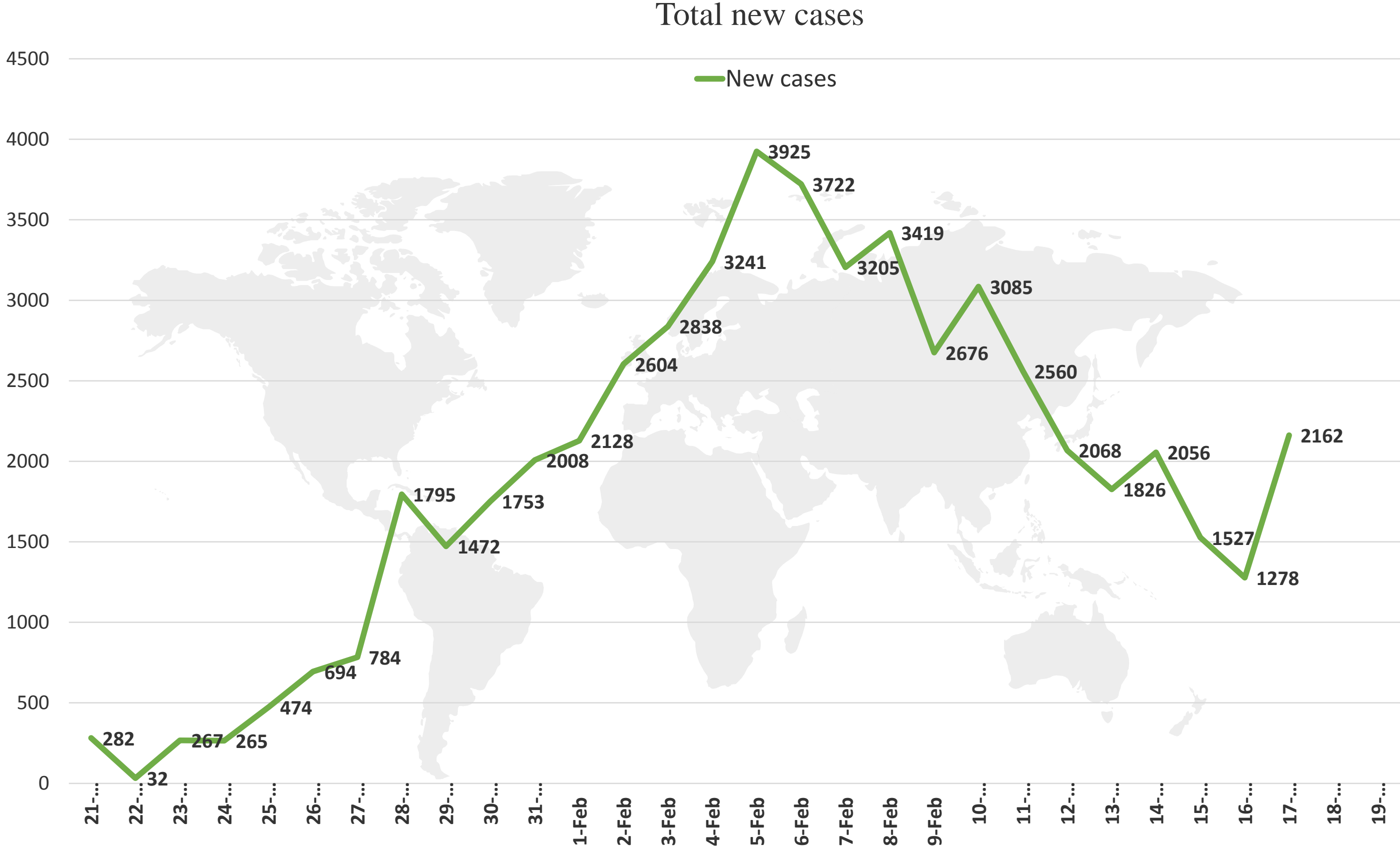
Data resource : [WHO](#)

— Number of infected cases



EPIDEMIOLOGY:

Figure 3: Number of new cases (January 21 to February 17, 2020)



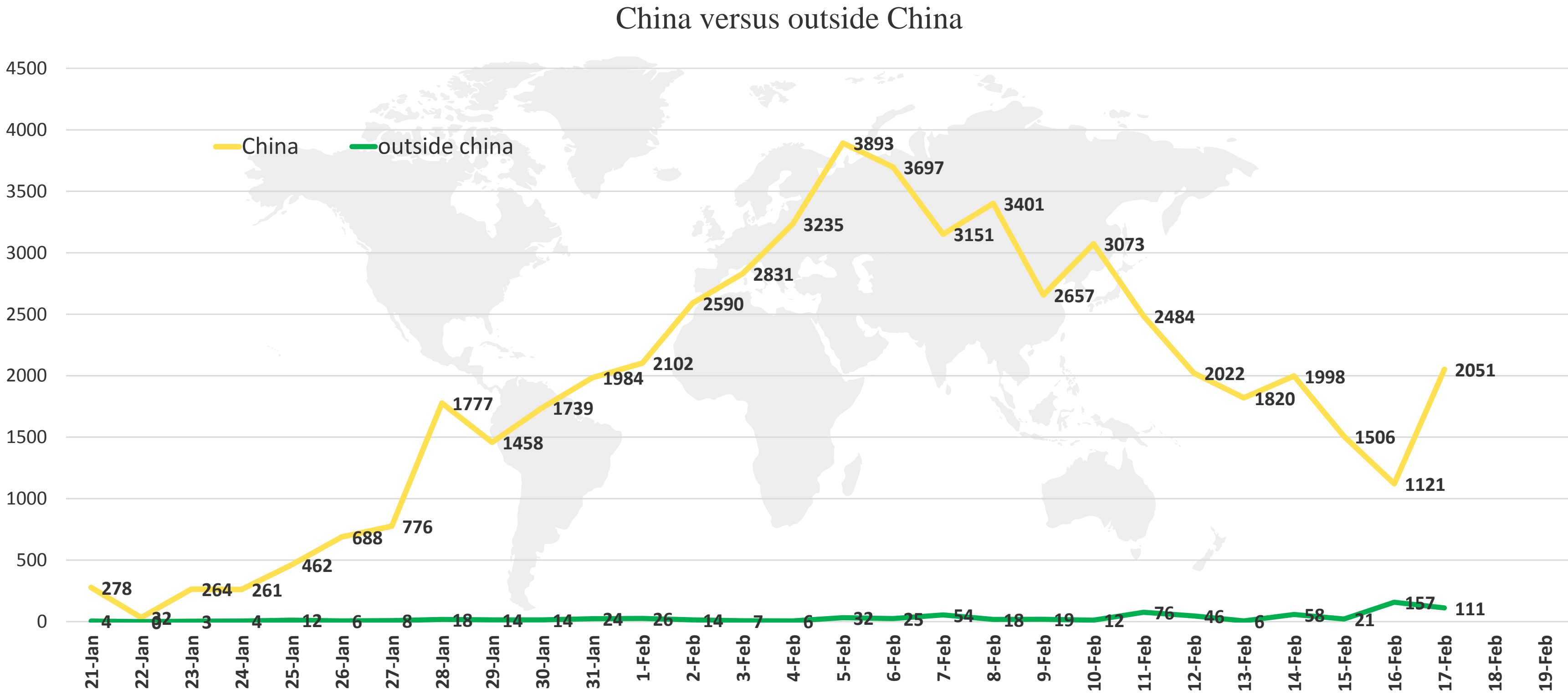
Line graph published by Abu Dhabi Public Health Center 2020.

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



EPIDEMIOLOGY:

Figure 4: Number of new cases in China versus outside China (January 21 to February 17, 2020)



Line graph published by Abu Dhabi Public Health Center 2020.

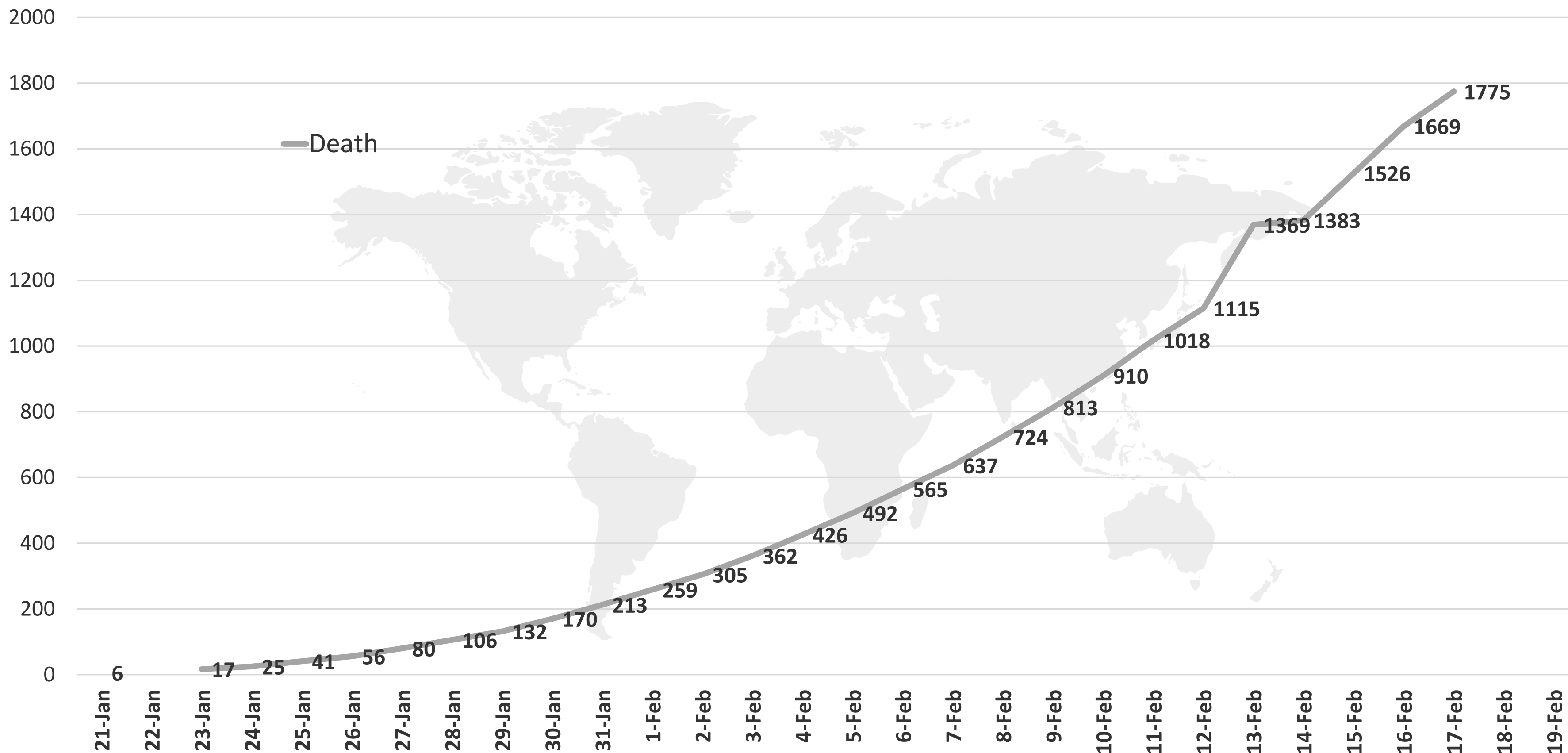
Data resource : [WHO](http://www.who.int)

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EPIDEMIOLOGY:

Figure 5: Number of total deaths (January 21 to February 17, 2020)



Line graph published by Abu Dhabi Public Health Center 2020.

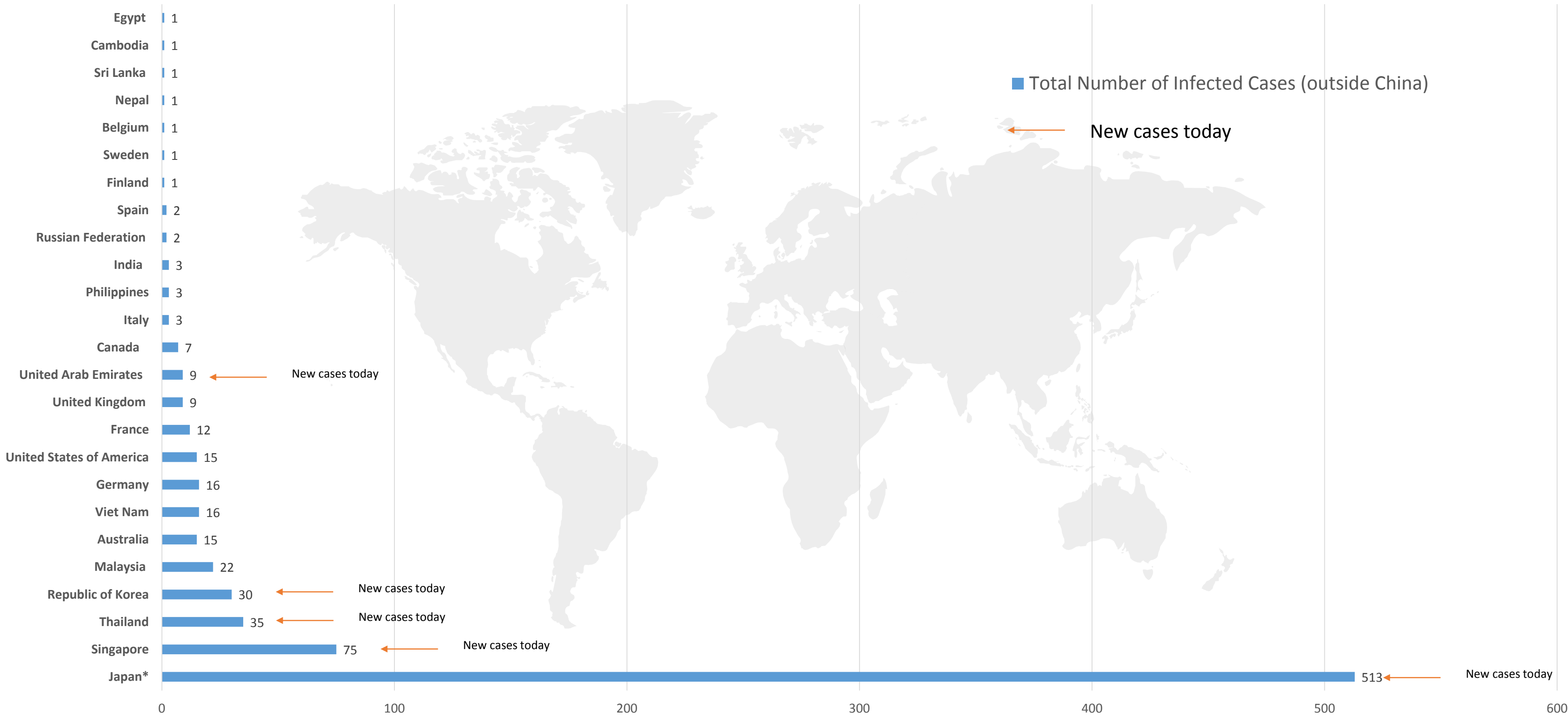
Data resource: [WHO](https://www.who.int/)

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EPIDEMIOLOGY:

Figure 6: Total number of cases outside China per country (January 21 to February 17, 2020)



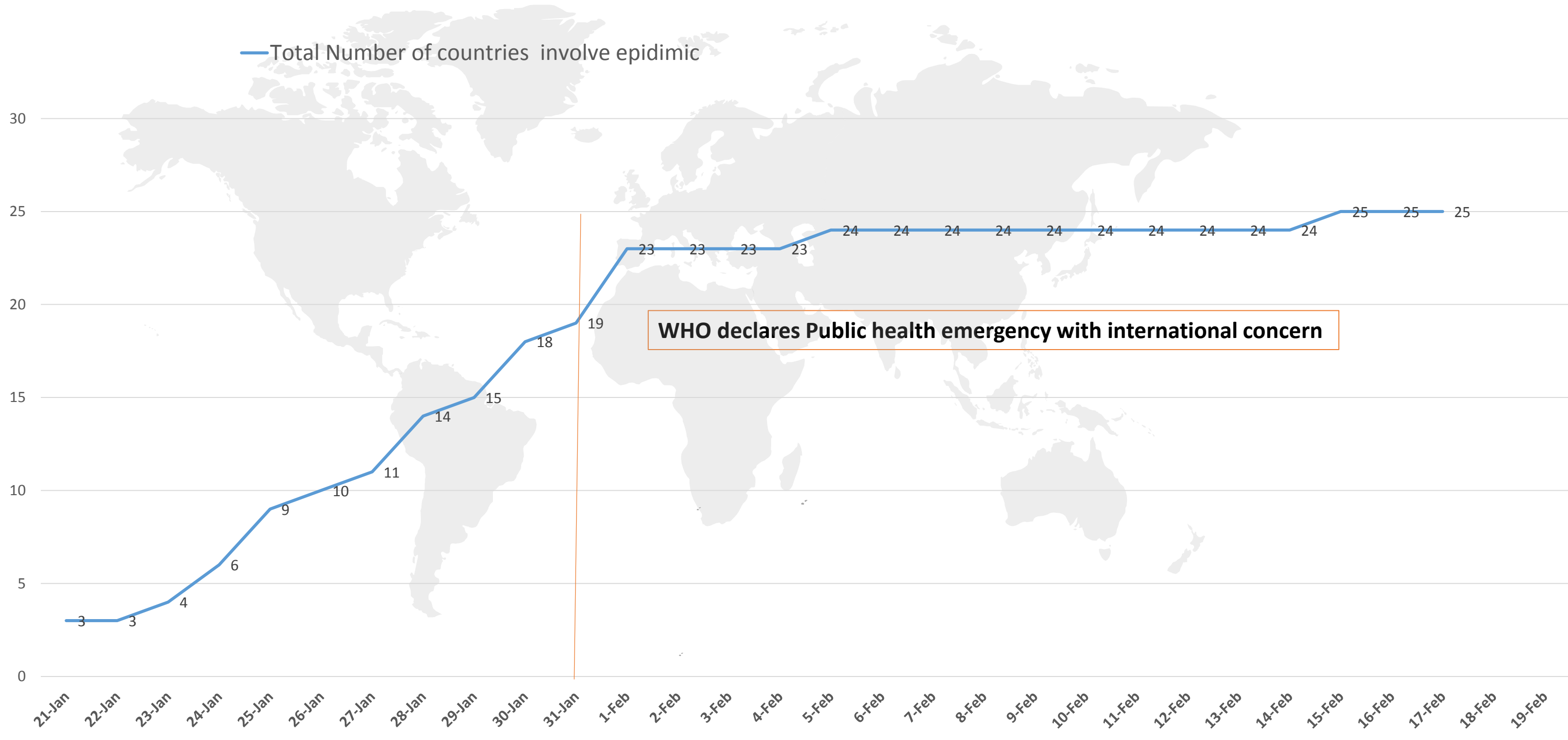
Bar chart published by Abu Dhabi Public Health Center 2020.

Data resource : [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 resource : [WHO](#)

EPIDEMIOLOGY:



WHO report 17/2/2020 important points

- No new countries have reported cases of COVID-19 in the past 24 hours.
- From 17th February, 2020, WHO started reporting all confirmed cases, including both laboratory-confirmed as previously reported, and those reported as clinically diagnosed (currently only applicable to Hubei province, China). From 13th to 16 February, they reported only laboratory-confirmed cases for Hubei province. This accounts for the apparent large increase in cases compared with prior situations reported.
- Based on the evidence currently available about COVID-19, WHO has developed guidance documents for managing public health events at points of entry and mass gatherings.
- The WHO Eastern Mediterranean office has updated information on COVID-19 cases on the WHO website.



EPIDEMIOLOGY:

Figure 6: Comparison of three viruses

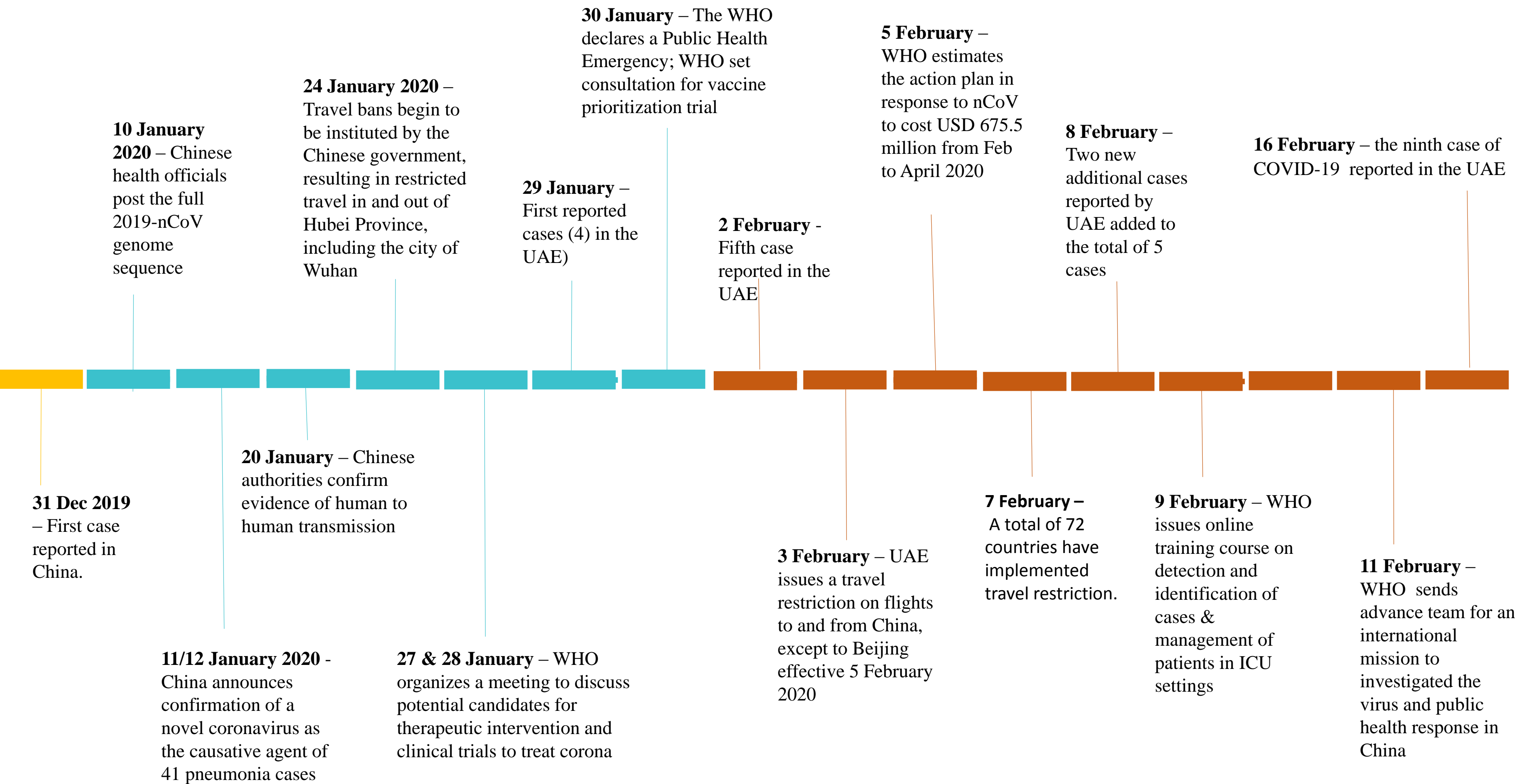
Virus	SARS COV2	SARS-COV	MERS-COV
Date of epidemic	2019	2002	2012
Countries	25	37	27
Infected cases	71429	8000	2494
Death cases	1772	800	858
Mortality rate	11%, 14%, 15 % per WHO 2-4% (unconfirmed)	10%	> 35 %

* Data until February 17, 2020

TIMELINE

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KEY FINDINGS IN SCIENTIFIC RESEARCH IN RELATION TO CHILDREN

Article 1: Title: First case of severe childhood novel coronavirus pneumonia in China

Published: after 7 February 2020*

Summery finding: 13-month-old male presenting with diarrhea and progressed to respiratory symptoms, shock and kidney failure. No positive contact. Two negative PCRs; third was positive. Treatment failed with Tamiflu but improved with continuous blood purification (dialysis). Sever symptoms may be attributable to a congenital abnormality in the kidney which was not diagnosed. Previously.

Link: <http://rs.yiigle.com/yufabiao/1180144.htm>

Article 2: Title: A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster

Published: 24 January 2020.

Summery finding: 10-year-old male with positive contact. Without symptoms. Lung imaging found to be positive and PCR was positive.

Link: <https://www.cdc.gov/coronavirus/2019-ncov/downloads/Chan-study-of-a-family-cluster-Lancet-1-20-2020.pdf>

Article 3 : Title: Facing a major outbreak of new coronavirus infections in 2019: reflections from pediatricians

Published: 6 February 2020. *

Summery finding: reported 38 confirmed cases of children. Cough was the main manifestation, some children showed weakness, myalgia, nausea, vomiting, or diarrhea. Among them, 1.5-month-old infant only had frequent vomiting.

link : <http://www.365heart.com/show/143317.shtml>

* *Articles were translated from Chinese language.*



PUBLIC HEALTH RESPONSE

NO UPDATE

Article: 1

Title: Economic Impacts of Wuhan 2019-nCoV on China and the World

Published on
12 February 2020



[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30374-3/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30374-3/fulltext)

- Without urgent global actions to curtail the Wuhan 2019-nCoV within the shortest possible time, China is expected to lose up to \$62 billion in the first quarter of the year, while the world is likely to lose over \$280 billion over the same period.
- **Tourism sector**
 - The loss of Chinese tourists will cost more than \$73 billion.
- **The automotive industry:** (*Wuhan City is China's main steel and vehicle market*).
 - The production loss of over 1.7 million units is expected if the outbreak continues through mid-March.

** Note the article is still under peer-review. However, the article is indexed by the WHO research database*

CLINICAL FEATURES AND TRANSMISSION

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NEW UPDATE

Article 2

Title: First case of severe
childhood novel coronavirus

Published on
7 February 2020.



[http://rs.yiigle.com/yufabiao/
1180144.htm](http://rs.yiigle.com/yufabiao/1180144.htm)

Case of 13-month-old male

- **Clinical features:** presented with diarrhea for 6 days prior to admission; visited multiple clinics for the same reason, later developed severe respiratory symptoms, fever, change in mental status, and urinary symptoms.
- **Diagnosis:** Initially tested **negative twice** for COVID19 (PCR) throat swab. **Became positive on the 8th day of admission.** Admitted to the ICU for shock and renal (kidney) failure. Treatment: given Tamiflu and antibiotics (no improvements) but improved after continuous blood purification (dialysis). No h/o positive contact, however, it was thought he may have acquired it from a previous clinic encounter.
- **Conclusion:**
 - The incidence of COVID-19 in children is lower than in adults.
 - Main symptom is coughing, others include weakness, myalgia, nausea, vomiting, or **diarrhea (suggesting fecal-oral route transmission).**
 - We need to **pay attention to some cases of children without obvious respiratory symptoms.**
 - The patient's PCR was negative (pay attention to the method of collection of samples in children).
 - Extracorporeal continuous blood purification technology can be a treatment for children with severe COVID-19.
 - This case was also found to have hydronephrosis (most likely an underlying genetic disease that was not discovered previously), which may explain the development of severe symptoms.

CLINICAL FEATURES AND TRANSMISSION

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NEW UPDATE

Article 3

Title: Facing a major outbreak of new coronavirus infections in 2019: reflections from pediatricians

Published on
6 February 2020.

<http://www.365heart.com/show/143317.shtml>



- **January 31 2020 a total of 74 confirmed cases of children** were reported nationwide, with a minimum age of 1.5 months and a maximum age of 18 years. (*in this date the total of infected individual was 7187 per WHO report*)
 - Existing epidemiological data show that **43%** have a **history of exposure to the source of the epidemic**; **56%** have a clear history of **clustering of infected families**. At present, the government has announced the extension of the **Spring Festival holiday and the delay of school opening hours in high-endemic areas**, which is undoubtedly an effective measure to **reduce the spread of the epidemic**.
- The **number of childhood infections has increased significantly**, and it is estimated that the number of children with **hidden asymptomatic or mild infections** is higher.
- **No clear reports of children as a source of adult infection have been found.**
- The reported 38 cases. Present with mild symptoms. Most symptoms disappear within 1 week.
- **Diagnosis :**
- Negative throat swab was observed in 3 children, 2 days after the disease and 1 day after the disease
- For severe suspected cases, a negative single upper airway sample cannot rule out a diagnosis. It is recommended to increase the lower airway sample or repeat the upper airway sample.
- Of the 20 patients with lung imaging data, 13 had ground-glass CT or infectious lesions on CT; 4 chest X-ray films showed thickened lung texture; **3 had no abnormalities**.
- The author mention Recommendations for diagnostic criteria as well.



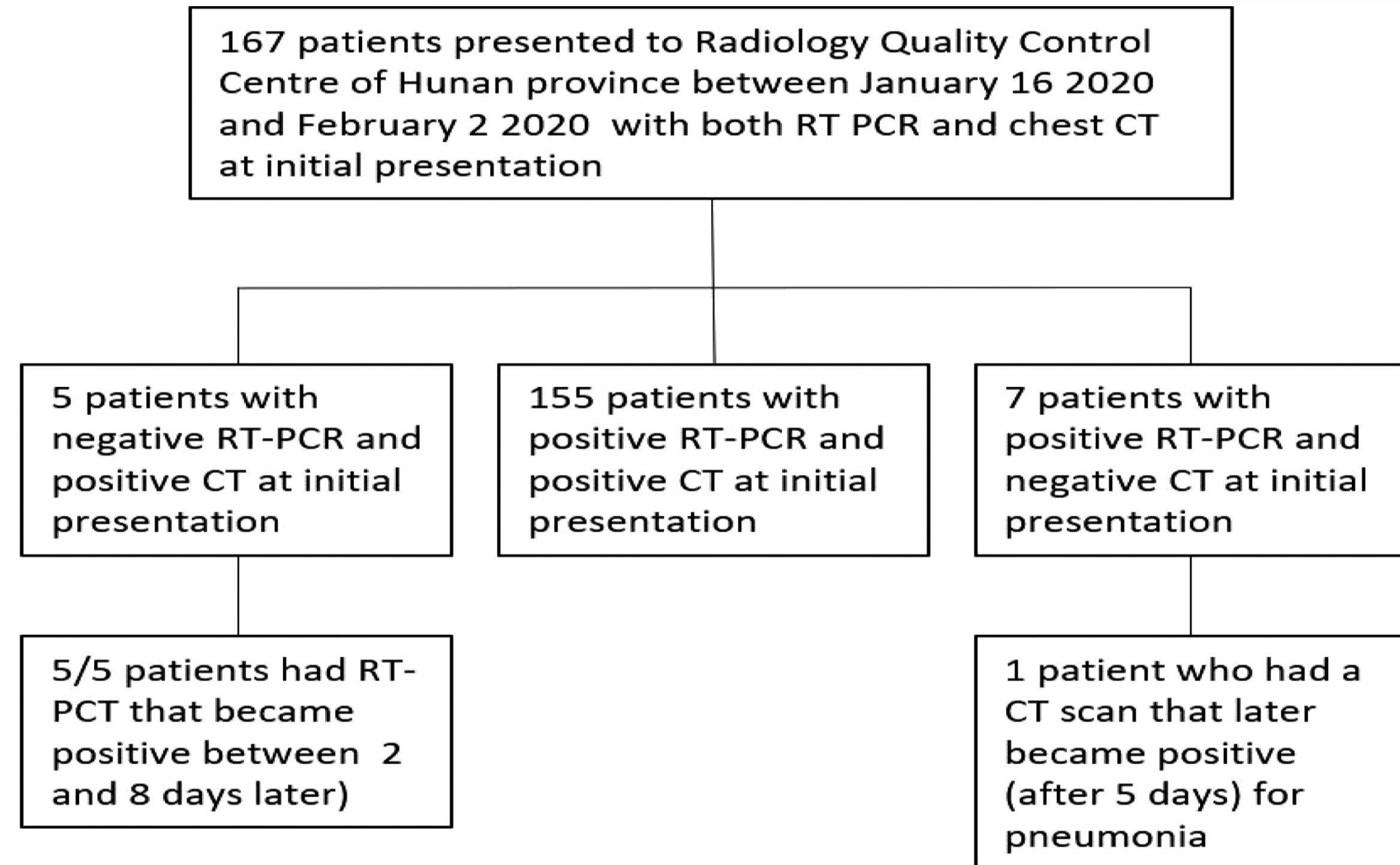
DIAGNOSIS:

NO UPDATE

Article 3 :

**Title: 2019-nCoV Pneumonia:
Relationship to negative RT-PCR testing.
Number of patient 167 patient.**

Published on 12 February 2020.



- Two radiologists with 10 years of experience interpreted the CT scans.
- 5 patients initially **tested positive** by **CT** and **negative** by **RT-PCR** but after consecutive testing with RT-PCR became positive.
- 7 patients tested **negative** by **CT** but **positive** by **RT-PCR**.
- The **five cases** who were **negative** by **RT-PCR** and **positive** by **CT** at initial are discussed.
 - All cases were had either h/o visiting Wahun or contact with positive cases.
 - All had symptom (some had mild symptoms).
- After isolation for presumed 2019-nCoV pneumonia, all patients were eventually confirmed with 2019-nCoV infection by **repeated swab tests**.

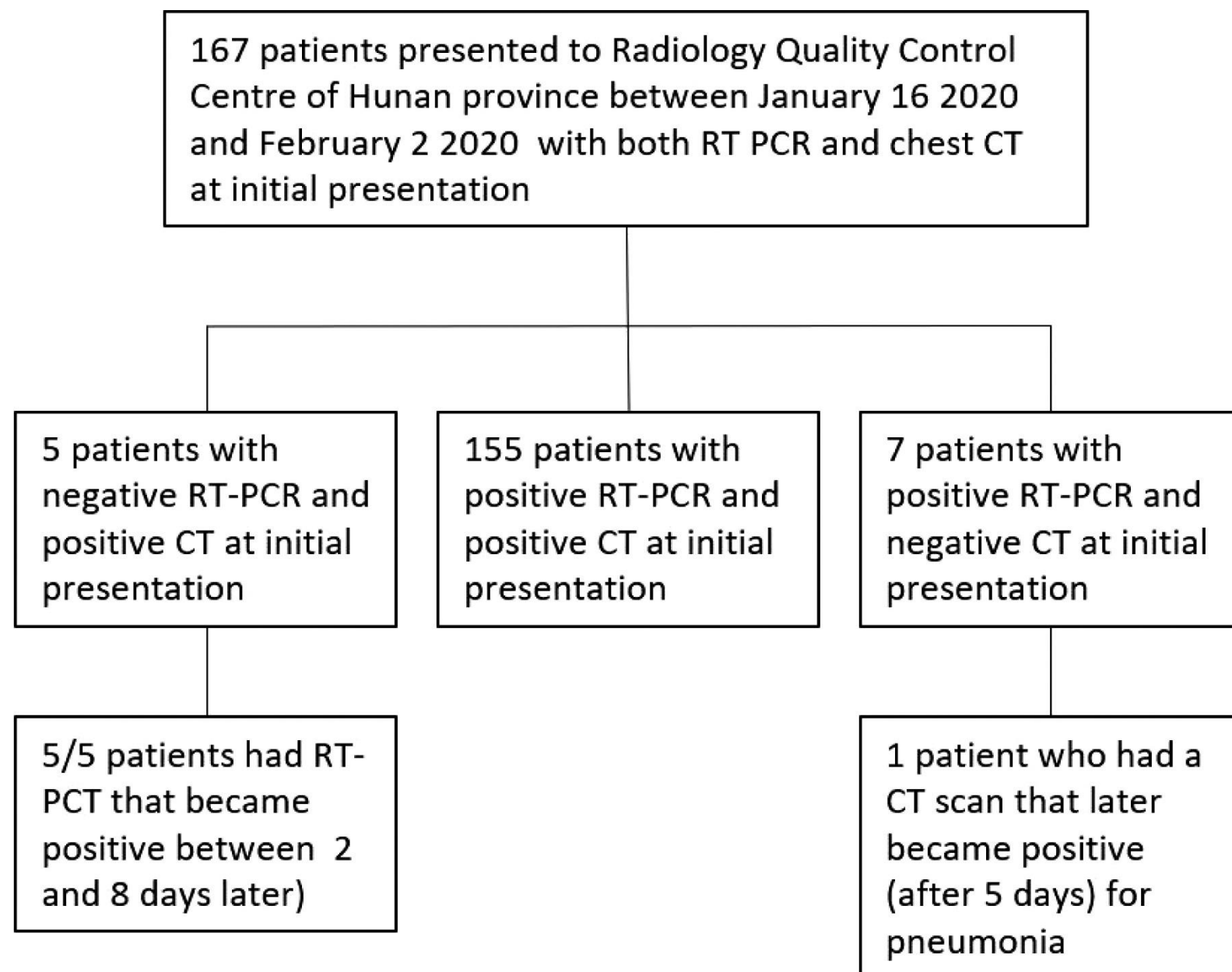
Conclusion from the study:

A combination of repeated swab tests and CT scanning may be helpful for individuals at **high clinical suspicion of nCoV infection** but who test **negative in RT-PCR screening**



DIAGNOSIS:

NO UPDATE



Our appraisal of the article:

Based on these findings:

- The study does not recommend all patients be screened using CT only, NOR does it recommend using a combination of **CT and RT PCR** in all cases.
- The study concludes that authorities and health care providers **should not depend on one-time RT-PCR** in detecting cases (especially with highly suspected patients).
- Note that CT still can miss positive cases (as the study showed negative results in 7 patients (see the graph)).
- In addition: CT scans are highly dependent on the radiologist's skill and sensitivity can be low when performed by a less-experienced radiologist (in the study the radiologists who confirmed the cases **had 10 years of experience**).
- Repeated swabs for patients at high risk (for up to 8 days with isolation) may be effective.

Access to the article : <https://pubs.rsna.org/doi/10.1148/radiol.2020200343>



PUBLIC HEALTH RESPONSE

NO UPDATE

Article :4

Title: Effectiveness of airport screening at detecting travelers infected with novel coronavirus (2019-nCoV)



Published on
6 February 2020

<https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2020.25.5.2000080#r11>

The article estimate the effectiveness of thermal image scan in airports by developing an equation/model

The equation/model was developed based on the following information on COVID-19 from previous articles (*the model will be updated as information on the disease are evolving*):

- The duration of the travel
- Sensitivity of entry and exit screening using thermal image scan is 86% (this means that 14% of screened patients could be missed)
- The percent who are asymptomatic (17% of those who got infected with COVID-19 according to previous articles can have no symptoms with typical screening procedures)
- Incubation period of 5.2 (± 4.1days)
- Time of symptoms onset to evaluation of disease
- **This equation does not include screening using PCR swab for all passengers.**

The study conclude the following:

- Under generally conservative assumptions on sensitivity, **46 of 100 infected travelers will enter undetected.**
- We find that exit or entry screening at **airports for initial symptoms, via thermal scanners or similar, is unlikely to prevent passage of infected travelers into new countries or regions where they may seed local transmission.**

For accessing the equation please use the following link:

https://cmmid-lshtm.shinyapps.io/traveller_screening/



PUBLIC HEALTH RESPONSE

NO UPDATE

Article : 5

Title: COVID-19: what next for public health?

Published on
13 February 2020

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30374-3/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30374-3/fulltext)



The article recommends nine measures to control the outbreak:

1. Close **monitoring** of the **epidemiology and effectiveness** of public health strategies and their social acceptance.
2. Provide **strategies** to the general populations and **vulnerable populations** most at risk, **with actionable information** for **self-protection**, including **identification of symptoms**, and **clear guidance for treatment** seeking.
3. Intensive source control is needed at the epicenter in China, i.e., **isolation of patients** and persons testing positive for COVID-19, **contact tracing**, and health monitoring, **strict health facility infection prevention and control**, and use of other active public health control interventions with continued active surveillance and containment activities at all sites where outbreaks are occurring.
4. Continued containment activities are needed around sites **outside China** where there are infected people and transmission among contacts, with intensive study to provide information on **transmissibility, means of transmission**, and **natural history of infection**, with regular reporting to WHO and sharing of data.
5. Intensified active surveillance is needed for possible infections in all countries using the **WHO-recommended surveillance case definition**.
6. **Resilient health systems** in all countries are needed, as with seasonal influenza, anticipating severe infections and the course of the disease in older people and other populations at risk of severe disease.
7. If widespread community transmission is established, a **transition plan that includes mitigation activities should be considered**, especially if contact tracing **becomes ineffective or overwhelming** and an **inefficient use of resources**. Examples of mitigation activities include **canceling public gatherings, school closure, remote working, home isolation, observation of the health of symptomatic** individuals supported by telephone or online health consultation, and **provision of essential life support, such as oxygen supplies, mechanical ventilators, and extracorporeal membrane oxygenation** equipment.
8. **Serological tests need to be developed to estimate current and previous** infections in general populations.
9. Continued **research** is important to understand the **source of the outbreak** by study of animals and animal handlers in markets to provide evidence necessary for prevention of future coronavirus outbreaks.



TREATMENT:

NO UPDATE

Latest article on January 27, 2020

Current trial: (Source: WHO, January 20, 2020)

- SAG members noted that a **randomized controlled trial was initiated in Wuhan** to assess the effect of **lopinavir/ritonavir with IFN-β1b**, and that trial material from the MIRACLE trial — which aimed to assess the same treatment for **MERS-CoV in Saudi Arabia** — was shared to support the initiation of the trial.

<https://apps.who.int/iris/bitstream/handle/10665/330692/WHO-HEO-RDBlueprintnCoV-2020.2-eng.pdf?sequence=1&isAllowed=y&ua=1>

- **Potential candidates for therapeutic treatment released 24 January 2020**

<https://www.who.int/blueprint/priority-diseases/key-action/overview-ncov-therapeutics.pdf?ua=1>

- **Update draft design for therapeutic trial published 27 January 2020**

- **Promote the use of information on MERS-COV and SARS-Cov to develop vaccine**

<https://apps.who.int/iris/bitstream/handle/10665/330695/WHO-HEO-RDBlueprintnCoV-2020.5-eng.pdf?sequence=1&isAllowed=y&ua=1>



VACCINATION:

NO UPDATE

Latest article on 27 of Jan 2020

Updated draft design for therapeutic trial published in **27 January 2020**.

Promote the use of information on MERS-COV and SARS-Cov to develop a vaccine

<https://apps.who.int/iris/bitstream/handle/10665/330695/WHO-HEO-RDBlueprintnCoV-2020.5-eng.pdf?sequence=1&isAllowed=y&ua=1>

List of suggested vaccines:

<https://www.who.int/blueprint/priority-diseases/key-action/list-of-candidate-vaccines-developed-against-ncov.pdf>