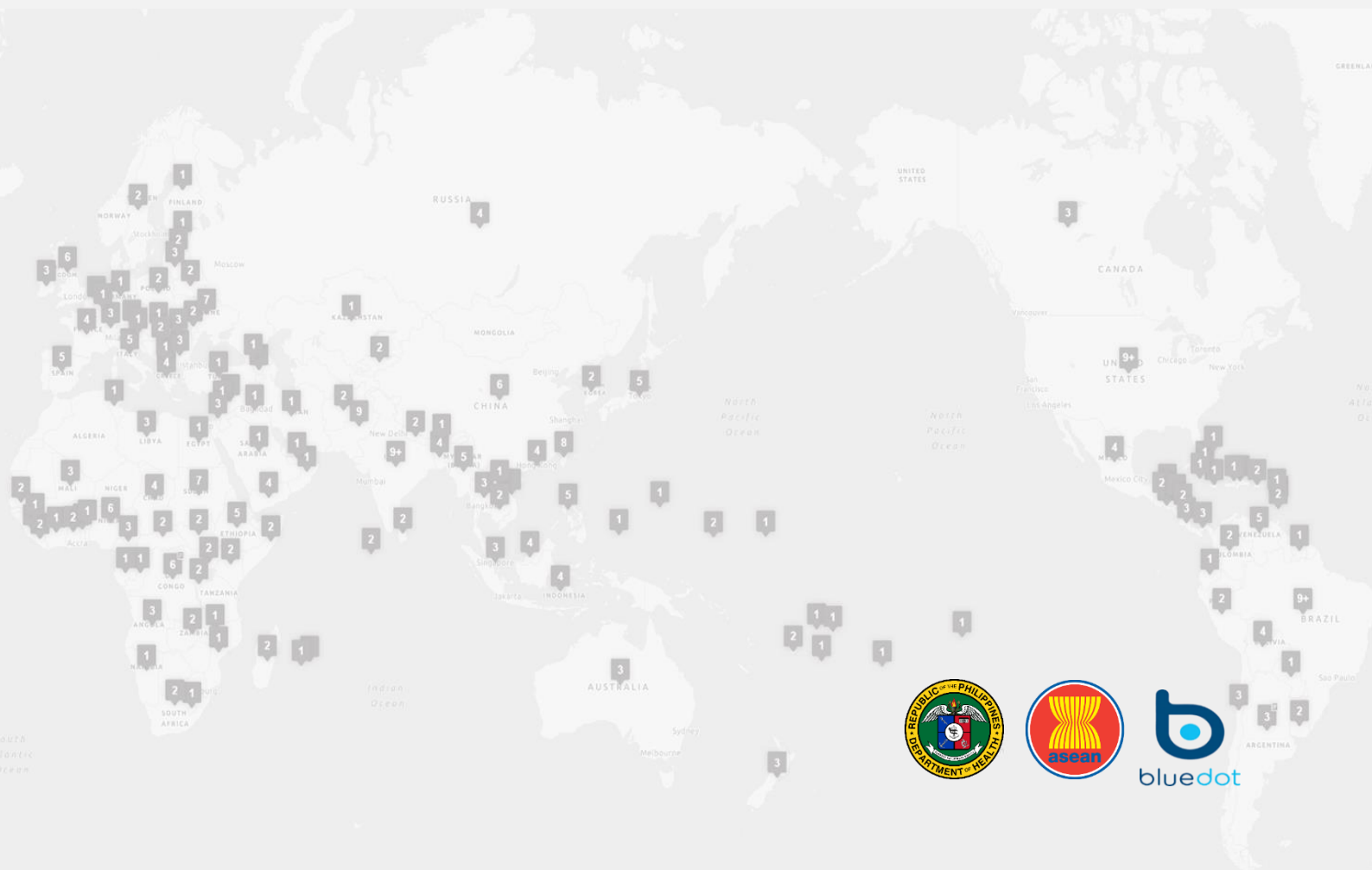


Risk Assessment for International Dissemination of 2019-nCoV across ASEAN

As of January 27, 2020



2019-nCoV Highlights and Situation Overview

Ground Zero - Wuhan City, Hubei Province, China

- Capital of Hubei province, People's Republic of China
- It is the largest city in Hubei and the most populous city in Central China, with a population of 19 million
- Seventh most populous Chinese city, and one of the nine National Central Cities of China.
- Reported a cluster of cases of a respiratory syndrome of unknown cause associated with the Wuhan China Seafood Market last 30 December 2019. Contact with meat from various animals sold in the market has been established as the most likely cause of the first reported human infections.

Cases and Deaths as of 27 January 2020

- As of January 27, worldwide, there were **2,923** confirmed cases, including **82** deaths.
- The 2019-nCoV outbreak, originally centered in **Wuhan city**, is continuing to show evidence of **broader geographic** spread across **mainland China**.
 - As of **January 27**, in China, there were **2858** confirmed cases. While most cases are being reported from Hubei, all provinces and autonomous regions in mainland China, except Tibet, have reported cases. There have been 82 deaths, all of which have occurred within Hubei province except one in each of Beijing, Shanghai, Henan, Hainan, Hebei, and Heilongjiang provinces.
- **65 imported cases** of 2019-nCoV have been reported in Thailand (8), Japan (4), South Korea (4), Taiwan (5), the United States (5), France (3), Singapore (5), Macao (6), Vietnam (2), Hong Kong (8), Nepal (1), Canada (2), Australia (5), Malaysia (4), Sri Lanka (1), Cambodia (1) and Germany (1).
- UN health agency said current estimates put the incubation period for the virus at between two and 10 days. The World Health Organization said on Monday it remained unclear if the deadly coronavirus spreading in China and beyond is contagious during its incubation period, before symptoms appear.

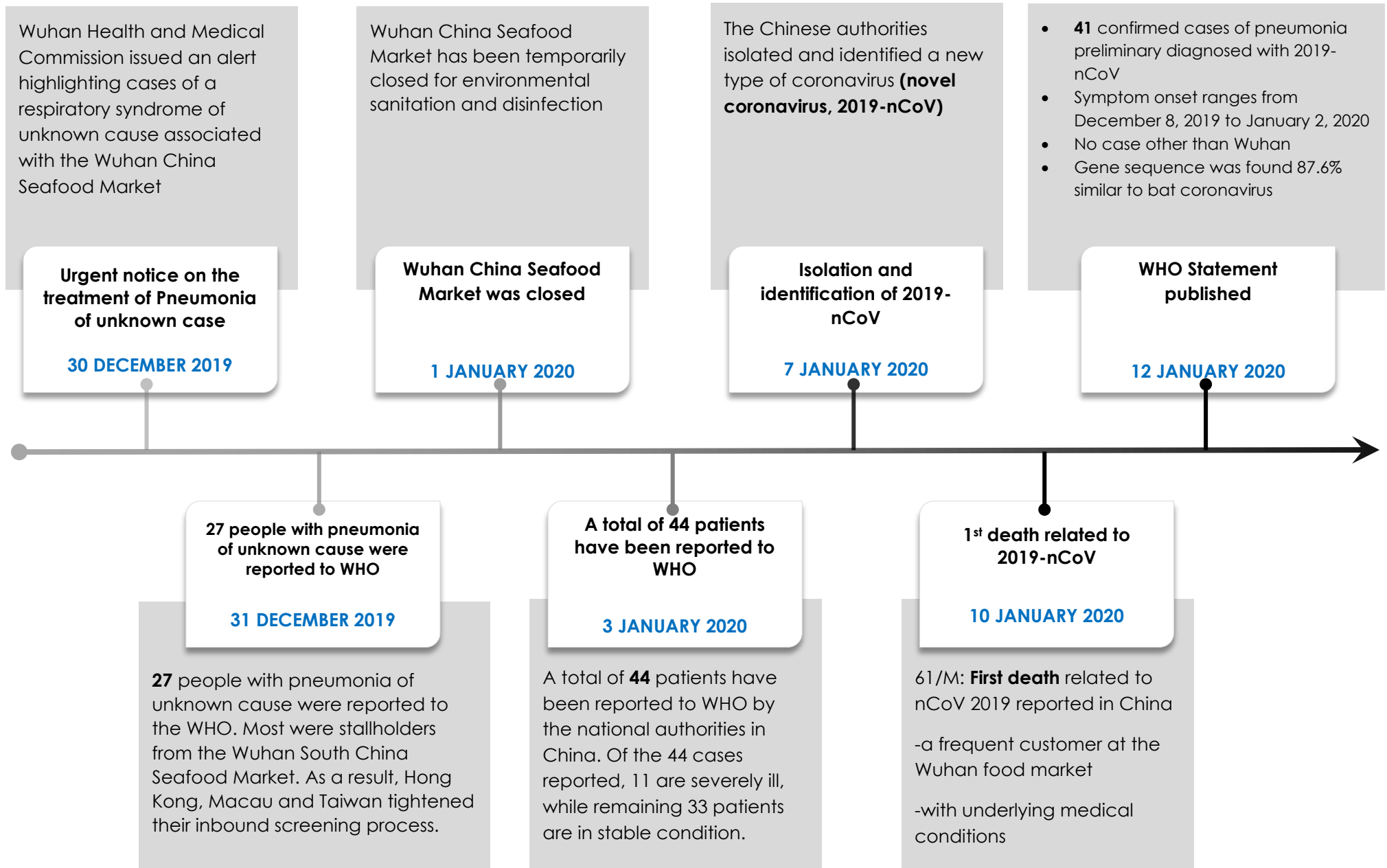
Control Strategies

- **China**
 - China started requiring nationwide use of monitoring stations for screening, identification and immediate isolation of coronavirus-infected travelers. These included airports, railway stations, bus stations and ports.

- A specialty hospital named **Huoshenshan Hospital** has been under construction as a countermeasure against the outbreak and to better quarantine the patients.
- China's National Health Commission is sending 1,230 medical staff in six groups to Wuhan City, central China's Hubei Province, to combat the novel coronavirus outbreak in the region. 3 of the 6 groups have begun their work in the virus-hit area. Local media earlier reported that 450 military medical personnel have also landed in the city to offer support. Wuhan announces building a second emergency specialty hospital, named **Leishenshan Hospital**, with a planned capacity of 1,300 beds, to be in use in half a month.
- Wuhan closed transport networks since **January 23, 2020**. **Chinese health officials suspended outbound travel** from Wuhan via air and rail, as well as local transportation services within the city, in an effort to curb further spread of the 2019-nCoV virus.
- Public activities related to the **Lunar New Year in Wuhan** have been **cancelled**.
- **Beijing** announced it will halt all inter-provincial bus and train services starting January 26. Schools in Beijing have been closed until further notice to prevent further spread of the coronavirus. Separately, the Beijing Government stated it will not lock-down the city.
- **Hong Kong** declares state of emergency. Hong Kong announced it would close schools until 17 February.
- **Philippines** will suspend issuance of visa upon arrival (VUA) to Chinese nationals amid coronavirus alarm starting January 28, 2020. This excludes those who have secured their entry visa from their foreign posts.
- **Singapore** announced further measures to curb the spread of the Wuhan coronavirus. All non-essential travel from Singapore to mainland China will be deferred and screenings at land and sea checkpoints will continue. Starting January 28, temperature screening will be expanded to cover travelers on all flights into Singapore. Likewise, inbound flights from mainland China will be given extra attention, with healthcare teams stationed nearby as passengers alight from these flights.
- **Japan's** Prime Minister revealed a plan to designate pneumonia caused by a new strain of coronavirus as a special infectious disease, with the aim of making it possible to provide urgent treatment to patients using public funds. The designation will allow the government to adopt similar measures as those taken for SARS and MERS-CoV without amending the law. These measures include compulsory hospitalization of infected people at one of approximately 400 designated medical institutions in Japan, as well as disinfection of sites where the virus has been detected. Physicians will be obliged to report any patients who test positive for the virus.

- **Canadian airport screening** has been initiated for all international travellers arriving in Toronto, Montreal and Vancouver international airports. Additional screening questions to determine if they have visited the city of Wuhan in China, where the outbreak was first reported, will be asked.
- **United States of America**
 - **US CDC** recommends that travelers avoid all nonessential travel to China.
 - The **United States Department of State** raised the travel advisory to level 3, i.e. reconsider travel to China due to novel coronavirus.
- **Australia** authorities are taking all necessary precautions to limit the transmission of the virus. Australia have processes in place to identify and treat cases such as the novel coronavirus, including isolation facilities in each state and territory,

Wuhan coronavirus: Timeline



61/F: imported case reported in **Thailand**

-taken to a Thai hospital immediately after arriving at Suvarnabhumi Airport in Bangkok on 8 January.

-Presently free of the infection, recovering and ready to return to Wuhan

1st confirmed case in Thailand

13 JANUARY 2020

30/M: Imported case reported and confirmed in **Japan**:

-travelled to Wuhan, returned on 6 January ; admitted in hospital on 16 January ; -no visit to the seafood market

-presented with persistent fever and eventually discharged from hospital

1st confirmed case in Japan

16 JANUARY 2020

Wuhan: 17 additional laboratory-confirmed cases, with three cases in critical condition. The number of laboratory-confirmed cases rose to 62 with age ranging from 30 to 79, of which 19 were discharged and eight remain critical

Additional confirmed cases in Wuhan

18 JANUARY 2020

2nd death related to 2019-nCoV

15 JANUARY 2020

69/M: **Second death** related to nCoV 2019 in China

-became ill on December 31, 2019, became worse on January 4, 2020, and was transferred to Wuhan Jinyintan Hospital for treatment.

-Admitted with severe myocarditis, abnormal renal function, and multiple organ functions. Died at 00:45 on

- **45 newly identified case in Wuhan**
- **2nd confirmed case in Thailand**

17 JANUARY 2020

Wuhan, China: Newly identified 45 cases of pneumonia with new coronavirus infection based on the clinical manifestations, epidemiological history of the patients, and the results detected by the diagnostic kit.

Thailand: 74/F: Imported case (2nd case) reported and confirmed

-travelled to Wuhan, arrived at Thailand on January 13

Wuhan: A total of 201 cases, 3 deaths reported

Shenzhen, Guangdong: 66/M, Chinese, visited relatives in Wuhan on December 29, 2019 and developed fever and fatigue on January; returned to Shenzhen on January 4 and was admitted to the hospital and placed in isolation on January 11, where he is currently reported to be in stable condition.

Beijing Daxing District Health Committee reported **2 laboratory-confirmed cases** of 2019-nCoV: with febrile illnesses, no respiratory symptoms and recent travel to Wuhan. They are currently in isolation, in stable condition

Total confirmed cases in China: 321 cases, 6 deaths

Newly confirmed cases were reported in several locations in China: **Zhejiang** (5), **Tianjin** (2), **Henan** (1), **Chongqing** (5), **Hunan** (1), **Yunnan** (1), **Shandong** (1), **Jiangxi** (1), and **Sichuan** (1). **Guangdong** and **Shanghai** reported 3 and 4 additional confirmed case respectively.

Taiwan: 55/F, Taiwanese who works in Wuhan reported to quarantine officials that she was suffering from a fever upon arriving at Taoyuan International Airport; first non-Chinese national diagnosed.

United States: 1st US case of Wuhan coronavirus reported. Patient was admitted to hospital on Sunday, after arriving in Seattle from Wuhan, China, on January 15. The man did not visit any of the markets connected to the virus while in Wuhan, nor did he know anyone ill, and

- **Wuhan: 136 additional confirmed cases; 3rd confirmed death**
- **3 confirmed cases outside Wuhan**

19 JANUARY 2020

- **1st confirmed case in Taiwan**
- **1st confirmed case in United States**
- **New cases outside Wuhan but within China**

21 JANUARY 2020

- **1st confirmed case in South Korea**
- **1st confirmed case in Shanghai, China**
- **Beijing: additional 3 confirmed cases**
- **Guangdong: 13 additional case**

20 JANUARY 2020

- First confirmed case reported in **South Korea** at point of entry
- **Shanghai** confirms its first case, bringing the total number of laboratory-confirmed cases in China to 218
- **Beijing** and **Guangdong** reported an additional three and thirteen laboratory-confirmed cases respectively.
- WHO raises possibility of 'sustained' human-to-human transmission

- WHO's emergency committee was unable to reach a consensus on whether the outbreak should be classified as PHEIC due to lack of information.
- China confirmed cases: **571** cases, **17** deaths
- **Additional cases in China:** Beijing (5), Guangdong (9), Shanghai (5), Tianjin (2), Zhejiang (5), Jiangxi (1), Hunan (3)
- New cases in China: Hainan (4), **Guangxi** (2), **Liaoning** (2), **Guizhou** (1), **Fujian** (1), **Anhui** (1), **Shanxi** (1), and **Ningxia** (1).
- **2** additional cases in **Thailand**
- **2** first cases in **Hong Kong**

- **France** reported its first two confirmed cases. The French Health Minister stated in a press conference that it is likely other cases would arise in the country
- **Nepal** confirms its first case, a student who returned from Wuhan
- The first incidence of *possible* human to human transmission outside of China was documented by the WHO in Vietnam. One confirmed case has no travel history in Wuhan.
- Confirmed cases: **948** cases (882 from China), **26** deaths reported

- WHO's Emergency Committee was unable to reach consensus on classifying 2019-nCoV as PHEIC
- New and additional cases in China
- Additional cases in Thailand
- 2 cases in Hong Kong was reported

22 JANUARY 2020

- 1st two confirmed case in France, the first in Europe
- 1st confirmed case in Nepal
- 1st confirmed incidence of human-to-human transmission
- Additional cases in China, Japan, South Korea, US, Singapore, Thailand, and Hong Kong

24 JANUARY 2020

- Wuhan suspended all public transport
- New and additional cases in China
- 1st confirmed case in Singapore
- 1st two confirmed case in Vietnam

23 JANUARY 2020

- Wuhan suspended all public transportation from 10 a.m. onwards, including all bus, metro and ferry lines. Additionally, all outbound trains and flights were halted
- New case in China: **Jiangsu** (1), **Heilongjiang** (2), **Xinjiang** (2), **Shaanxi** (3), **Gansu** (2)
- Additional cases: Fujian (3), Guangxi (3), Shanghai (7), Macau (1)
- Confirmed cases: **582** cases (571 cases in China), **17** deaths (all from Hubei)
- 1st confirmed case in **Singapore:** 66/M from China
- 1st two confirmed cases in **Vietnam:** 66-year-old father and 28-year-old son from China

- **Australia** confirmed its first four cases (1 in Victoria and 3 in New South Wales).
- **Malaysia** confirms its first four cases in Johor Bahru
- **Canada's** first case appeared in **Toronto**. 50s/M had travelled to Wuhan and recently took a flight back to Toronto.
- **Additional cases: Japan (1), Thailand (2), Singapore (1)**
- **Hong Kong** declares state of emergency. Hong Kong announced suspension of classes in all schools until 17 February 2020

- The **Sri Lankan Health Ministry** confirmed its 1st case of coronavirus, a 43 year old Chinese woman
- **Cambodia** confirmed its first case of the virus in a Chinese man who came with his family from Wuhan to the coastal city of Sihanoukville
- **Germany** confirmed its first case
- **Beijing** reports **first death** from coronavirus, 50/M
- Confirmed cases: **2923** cases (**2858** from China), **82** deaths reported

- 1st four confirmed cases in Australia
- 1st four confirmed cases in Malaysia
- 1st confirmed case in Canada
- Additional cases in Japan, Thailand, and Singapore
- Hong Kong declares state of emergency

25 JANUARY 2020

- 1st confirmed case in Sri Lanka
- 1st confirmed case in Germany
- 1st confirmed case in Cambodia
- Beijing reported its first death

27 JANUARY 2020

- Shanghai reported first death
- China banned wildlife trade
- Additional cases in the US, Macao, Hong Kong, and Thailand
- CCDC started developing vaccines against 2019-nCoV

26 JANUARY 2020

- **Shanghai** reported its first death, 88/M.
- China **banned all wildlife trade** with immediate effect
- Additional cases: United States (3), Macao (3), Hong Kong (3) and Thailand (1)
- The Chinese Center for Disease Control and Prevention (CDC) has started developing **vaccines against the novel coronavirus (2019-nCoV)**. CCDC has isolated the virus and is currently identifying seed strain

Map of 2019-nCoV Affected Countries

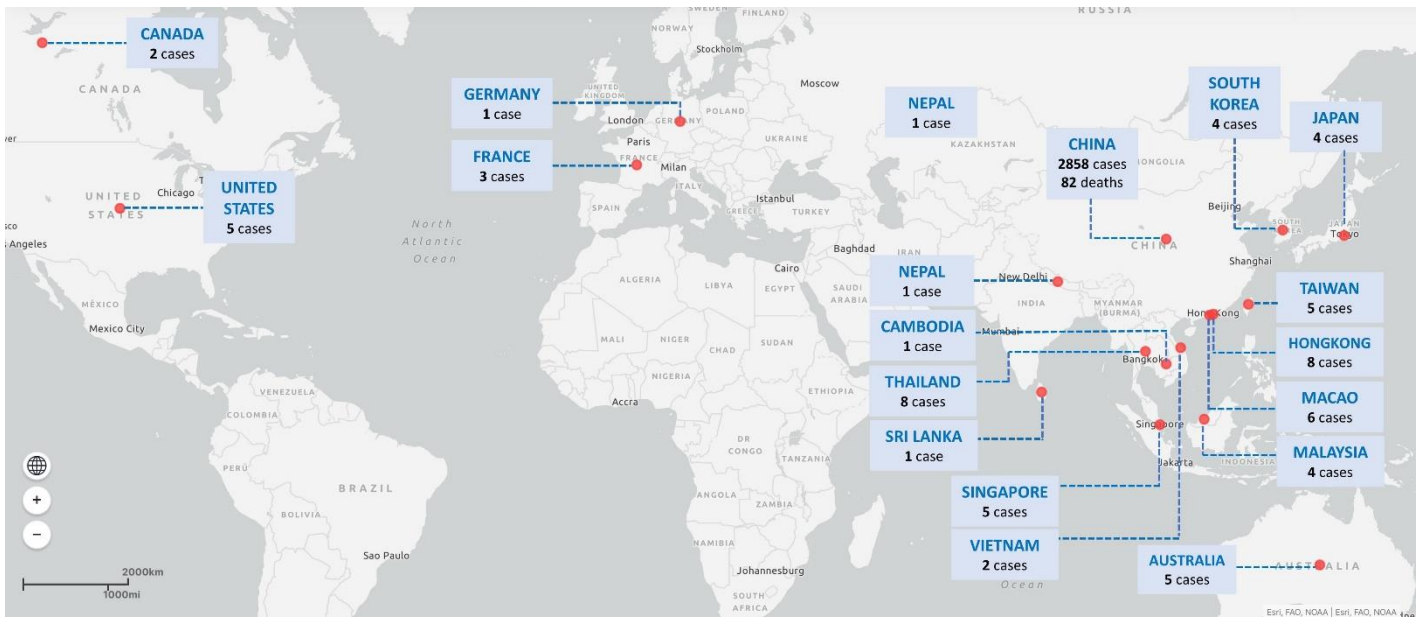


Figure 1. Map of countries with 2019-nCoV confirmed cases as of January 27, 2020

Reasons for Concern

- There is evidence of **broader geographic** spread across **mainland China** and the **rest of Asia, Australia, Europe, USA and Canada**
- WHO said earlier that an animal source seemed to be "the most likely primary source" with "some limited human-to-human transmission occurring between close contacts."
- WHO's assessment of the risk of this event has not changed since the last update (22 Jan): **very high in China, high at the regional level** and **high at the global level**. Using the Biodiaspora tools, there's approximately **21% to 28% risk of disease importation** to ASEAN region via air travel. The risk of importation is interpreted as the probability of at least one (1) imported infected traveler in one month going to area of destination. In addition, the **risk of exportation is approximately 61% to 81%** which means there's at least 1 to 2 exported infected traveler in one month. This is based in the case burden of the source region and the monthly outbound air passenger volume. Countries with more flights and seats from China are at *greater risk* of importing an infected traveler from China.
- Evidence supports human-to-human transmission of the virus.
 - In Guangdong, two patients were infected by family members who visited Wuhan.
 - Fifteen medical workers helping with coronavirus patients in Wuhan have also been diagnosed with pneumonia, with one in critical condition.
 - The Wuhan South China Seafood Market which sold various live animal species and may have been the source of the novel virus, was closed 01

January 2020. The increasing cases reported more recently indicate further spread through human-to-human transmission is likely to continue.

- Further information is required to understand how readily the virus can be transmitted between infected individuals.

Public Health Outlook

- WHO emphasized that even without the declaration of a public health emergency of international concern (PHEIC), there is already a coordinated international health response to the current coronavirus outbreak.
- With evidence that 2019-nCoV can be transmitted between humans, and daily reports of international importation, further domestic and international spread is possible. Southeast Asian nations are most highly connected to Wuhan by international air travel. Many international cities are connected to the larger affected region.
- Close monitoring of case reports from within China and highly connected countries is essential to prepare for further domestic and international spread of 2019-nCoV.
- It is expected that further spread within China may occur secondary to increased travel for the Chinese Lunar New Year which takes place on January 25th.
- The WHO has provided general recommendations following the MERS Guidelines to the medical community including the use of enhanced standard infection prevention and control practices, especially in emergency departments. For the general public, preventive measures include avoiding close contact with people suffering from acute respiratory illnesses, avoiding contact with wild or farm animals in affected areas, and practicing good hand and respiratory hygiene.

Risk of 2019-nCoV spread via Air Travel

AIR TRAVEL FROM WUHAN TO INTERNATIONAL CITIES IN 2019

Table 1. Top ranking international countries receiving passengers from Wuhan Tianhe International Airport, Hubei, China in 2019.

Rank	Origin City	Destination Country	Direct volume	Indirect Volume	Total Volume*
1	Wuhan	China	9,980,789	44,494	10,025,283
2	Wuhan	Thailand	268,118	59,237	327,355
3	Wuhan	Japan	102,229	36,263	138,492
4	Wuhan	Malaysia	94,920	35,627	130,547
5	Wuhan	Taiwan	88,768	16,975	105,743
6	Wuhan	Singapore	76,206	16,693	92,899
7	Wuhan	Korea (South)	67,205	11,690	78,895
8	Wuhan	Hong Kong (SAR)	71,521	374	71,895
9	Wuhan	Indonesia	33,855	26,902	60,757
10	Wuhan	United States	11,981	44,347	56,328
11	Wuhan	Cambodia	35,363	20,728	56,091
12	Wuhan	Australia	17,671	37,100	54,771
13	Wuhan	Macao (SAR)	42,759	74	42,833
14	Wuhan	Viet Nam	19,905	15,600	35,505
15	Wuhan	United Kingdom	15,473	13,201	28,674
16	Wuhan	United Arab Emirates	21,777	3,617	25,394
17	Wuhan	Philippines	1,515	21,214	22,729
18	Wuhan	France	11,000	11,436	22,436
19	Wuhan	Canada	0	18,368	18,368
20	Wuhan	Italy	7,591	10,634	18,225

*Data from International Air Travel Association (IATA) totaled across January to November 2019

ESTIMATED AIR TRAVEL FROM WUHAN TO ASEAN COUNTRIES FROM JANUARY-MARCH 2020

Table 2. Estimated travel data from Innovata (using Biodiaspora tools) based on the booked flights from Wuhan to ASEAN countries

Rank	Origin City	Destination Country	Destination City	Flights	Seats*
1	Wuhan	Thailand	Bangkok	477	83,732
			Phuket	91	16,380
			Chiang Mai	39	6,162
2	Wuhan	Singapore	Singapore	130	37,414
3	Wuhan	Malaysia	Kota Kinabalu	130	22,971
			Kuala Lumpur	3	1,110
4	Wuhan	Vietnam	Ho Chi Minh	91	7,020
			Sihanoukville	13	2,340
5	Wuhan	Indonesia	Denpasar Bali	39	8,385

*Data is still incomplete and may vary from the actual passengers travelling to country of destination
 Note: Chinese health officials suspended outbound travel from Wuhan via air and rail since January 23, 2020



Figure 2. Map showing air travel movements from Wuhan to ASEAN countries in January to March 2020

ESTIMATED AIR TRAVEL FROM CHINA TO ASEAN COUNTRIES FROM JANUARY-MARCH 2020

Table 3. Estimated travel data from Innovata (using Biodiaspora tools) based on the booked flights from China to ASEAN countries

Rank	Origin Country	Destination Country	Flights	Seats*
1	China	Thailand	17,830	3,371,183
2	China	Singapore	5,171	1,168,477
3	China	Malaysia	4,629	943,410
4	China	Cambodia	4,771	813,020
5	China	Vietnam	3,798	662,638
6	China	Indonesia	2,706	588,099
7	China	Philippines	2,101	394,541
8	China	Myanmar	1,583	257,693
9	China	Lao PDR	727	116,509
10	China	Brunei	156	24,284

**Data is still incomplete and may vary from the actual passengers travelling to country of destination*

Note: Chinese health officials suspended outbound travel from Wuhan via air and rail since January 23, 2020

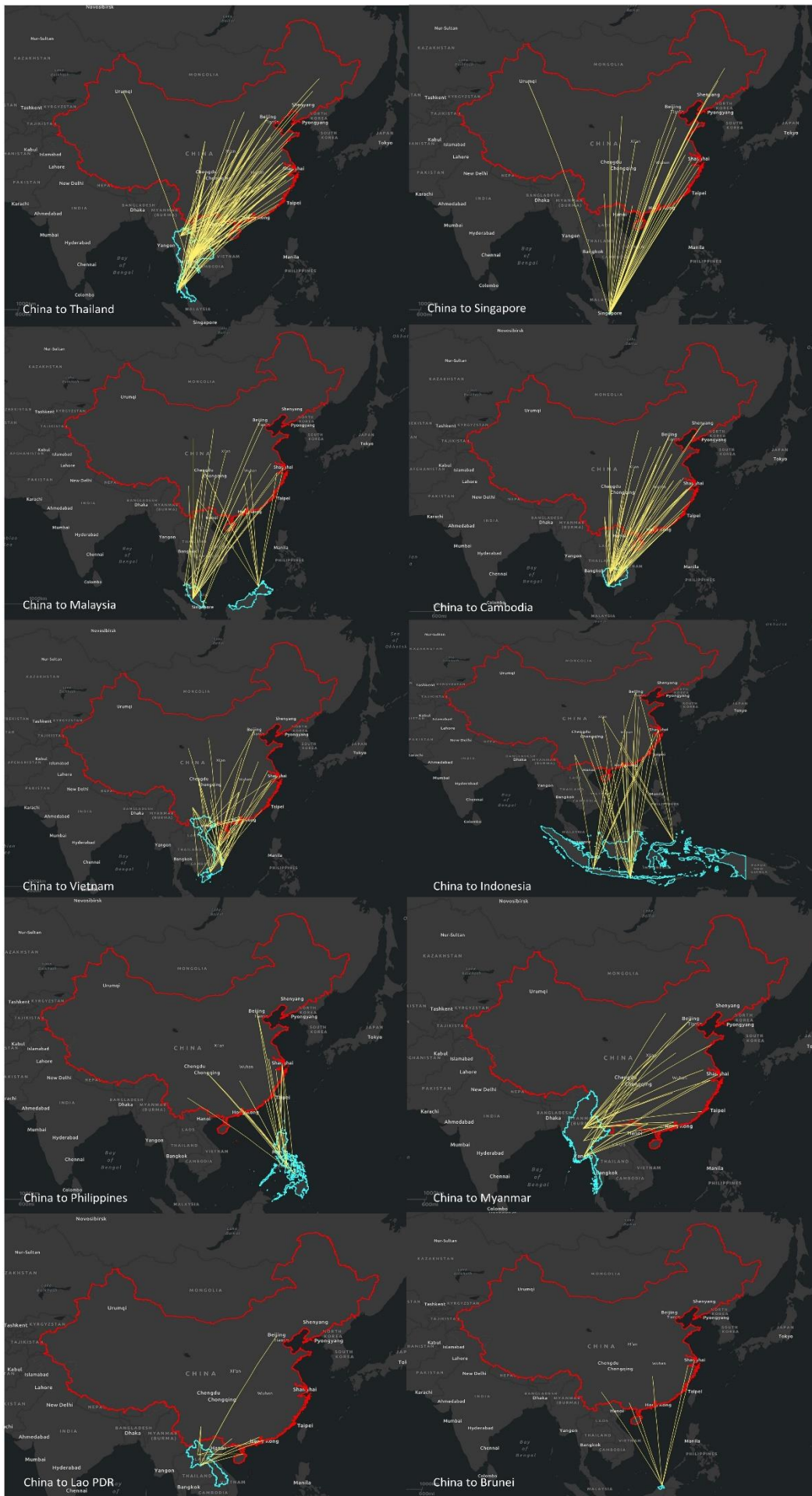


Figure 3. Map showing air travel movements from China to ASEAN countries in January to March 2020



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