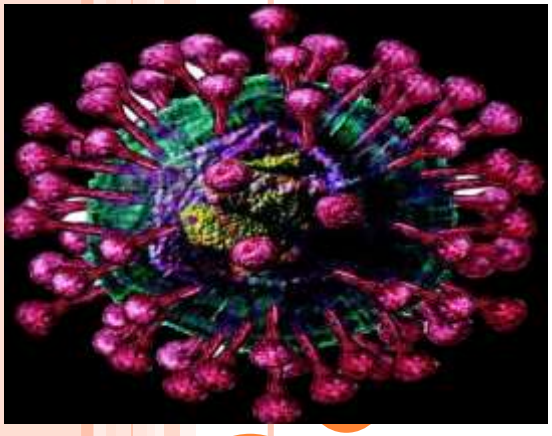
Novel Coronavirus Outbreak



Dr. Syed Kamrul Hasan
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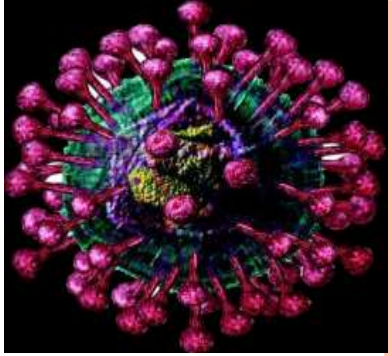
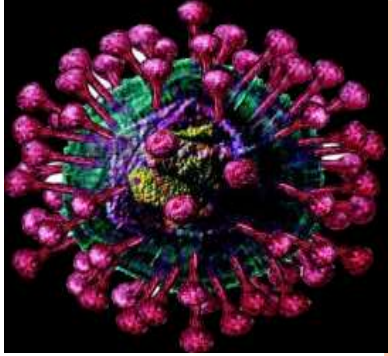
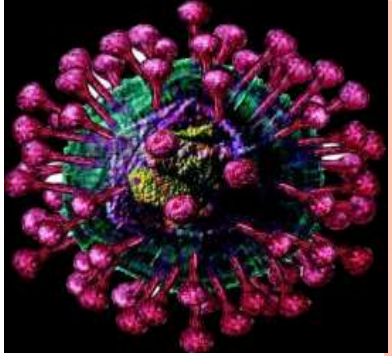
Introduction



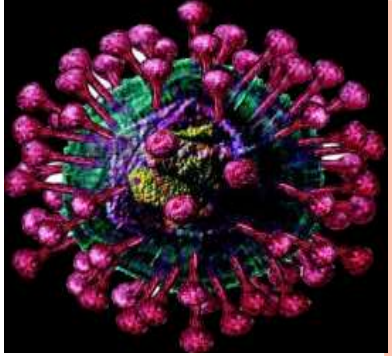
- Corona virus was first identified as a cause of the common cold in 1960.
- Until 2002, the virus was considered a relatively simple, nonfatal virus.
- An outbreak of severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002 to 2003 in Guangdong province in China, caused an eventual 8,098 confirmed cases, resulting in 774 deaths reported in 17 countries.



- Since then scientists became deeply concerned about the pathogenesis of coronaviruses.
- In 2012, again another coronavirus MERS-CoV caused an outbreak in Saudi Arabia caused 1227 cases with fatality rate 37%.



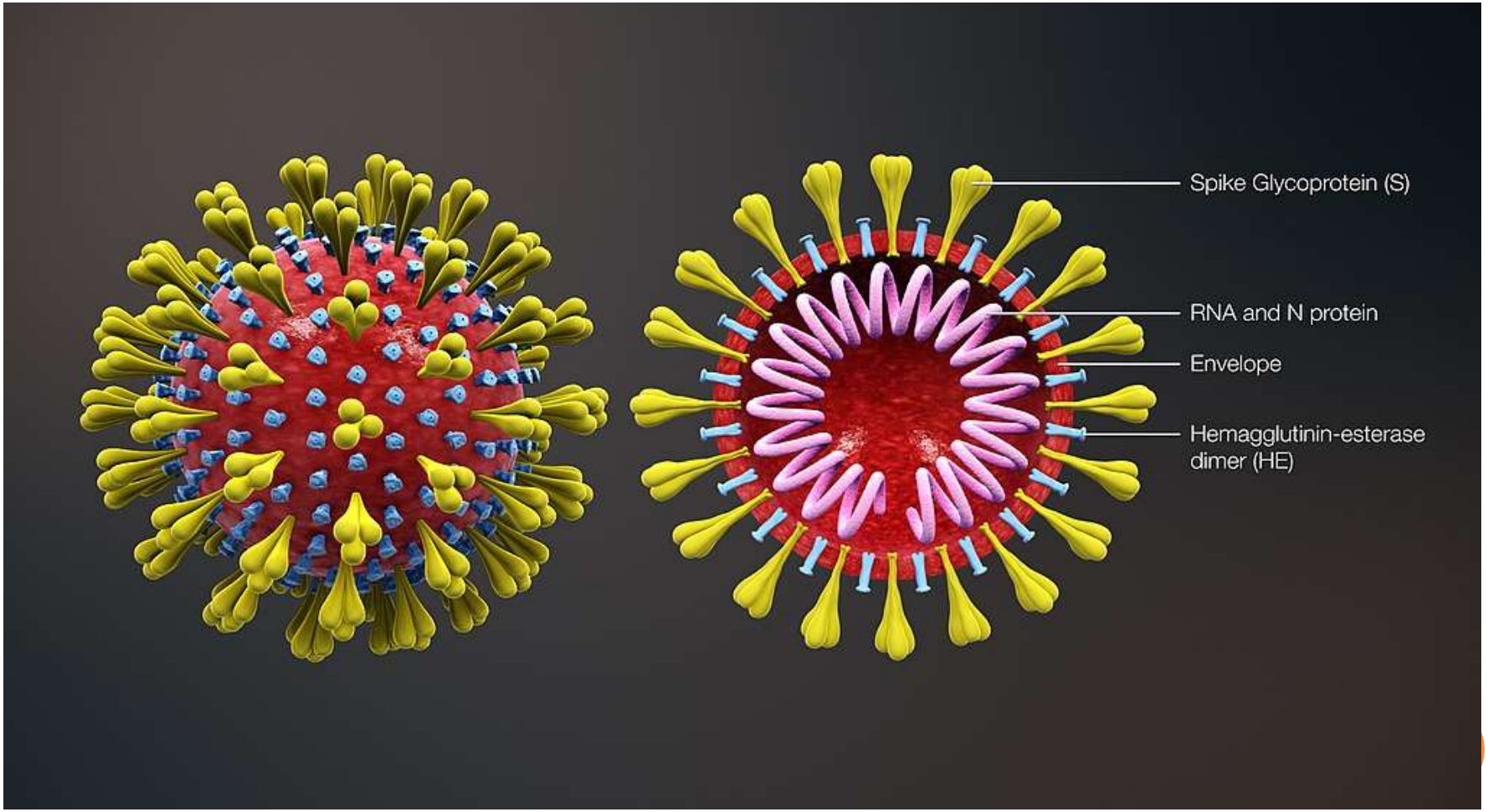
- Over the last three decades there have been three attacks of three different coronaviruses, SARS-CoV, MERS CoV and the recent one 2019 novel coronavirus (2019-nCoV).

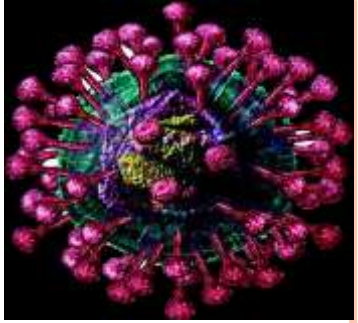


Characteristics:

- Family: Coronaviridae
- Gender: Coronavirus
- Genome: linear positive sense single-stranded RNA, pleomorphic, 80 to 220 nm, 30 serotypes
- Spherical or helical.
- 60-200 nm. in diameter.
- Total RNA without segmentation

Coronavirus

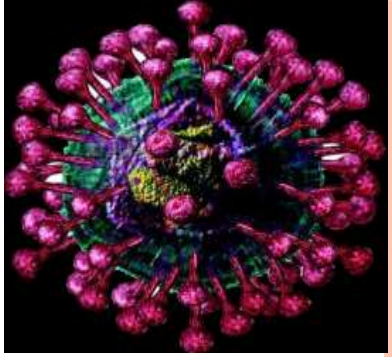




- Surface antigens are glycoproteins and nucleoproteins internally.
- Glycoproteins were characterized:

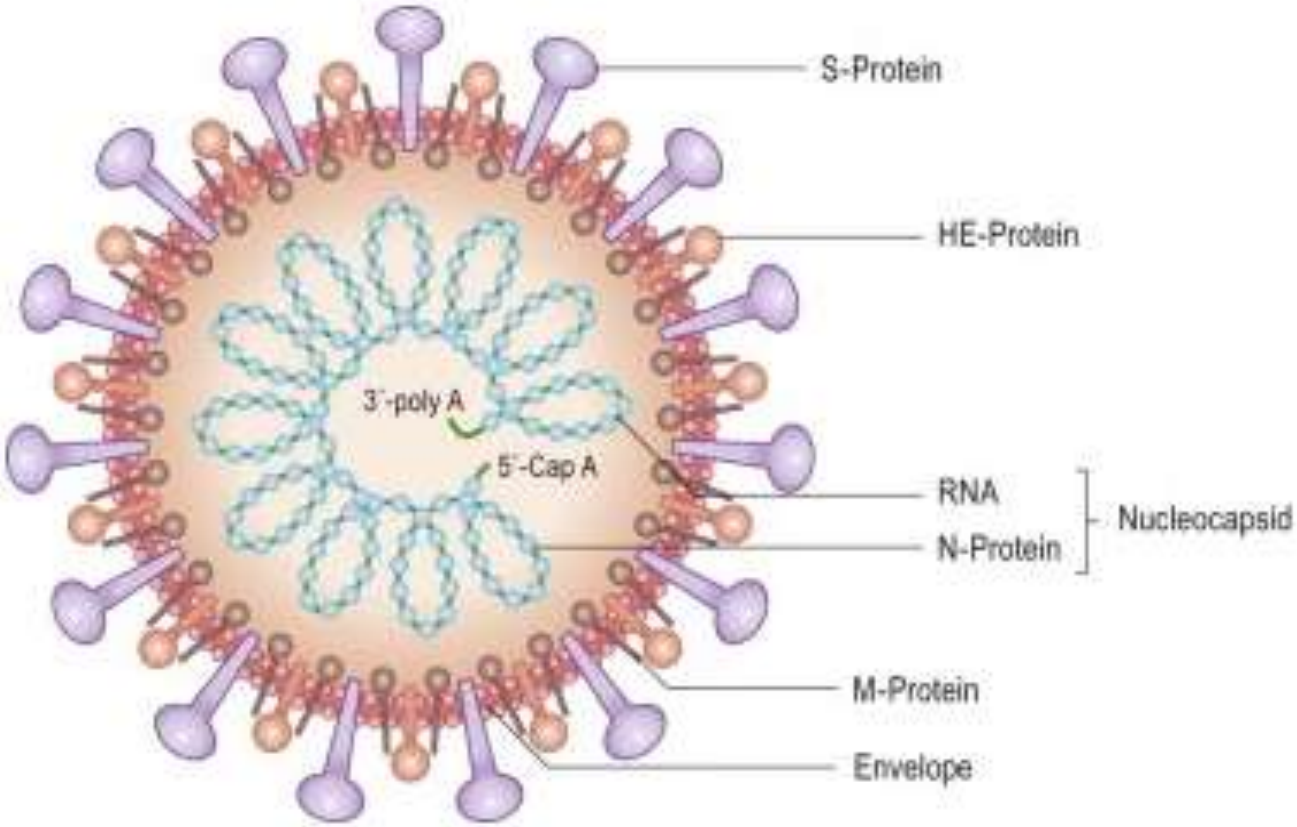
  E1. Transmembrane.

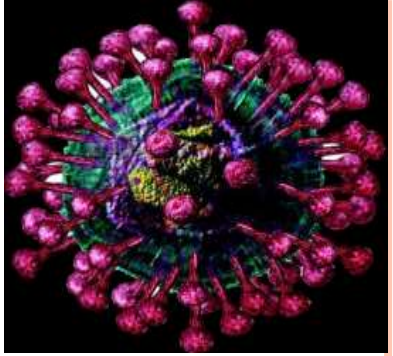
  E2. Adhesion to the cell membrane.
- Protein S. Form projected responsible for stimulating, neutralizing antibody and interaction with cellular receptors.



- Bind to cells via specific receptors.
- Enter through membrane fusion.
- In the cytoplasm, the viral RNA is translated by the host machinery.
- Viral proteins are synthesized, assembled, are fused to the cell membrane.

Coronavirus



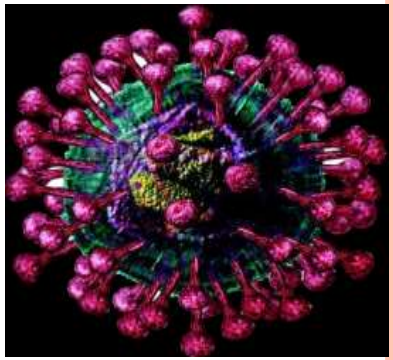


Major Proteins:

- **S – spike (receptor binding cell fusion).**
- **E – envelope (small: envelope protein, not as abundant as S).**
- **M – membrane protein (transmembrane budding and envelope formation)**

2019 Novel Coronavirus (2019-nCoV)

- A new strain of coronavirus which differs considerably in genetic structure from previously recognized coronavirus.
- Othername: Wuhan CoronaVirus, Wuhan seafood market pneumonia virus.

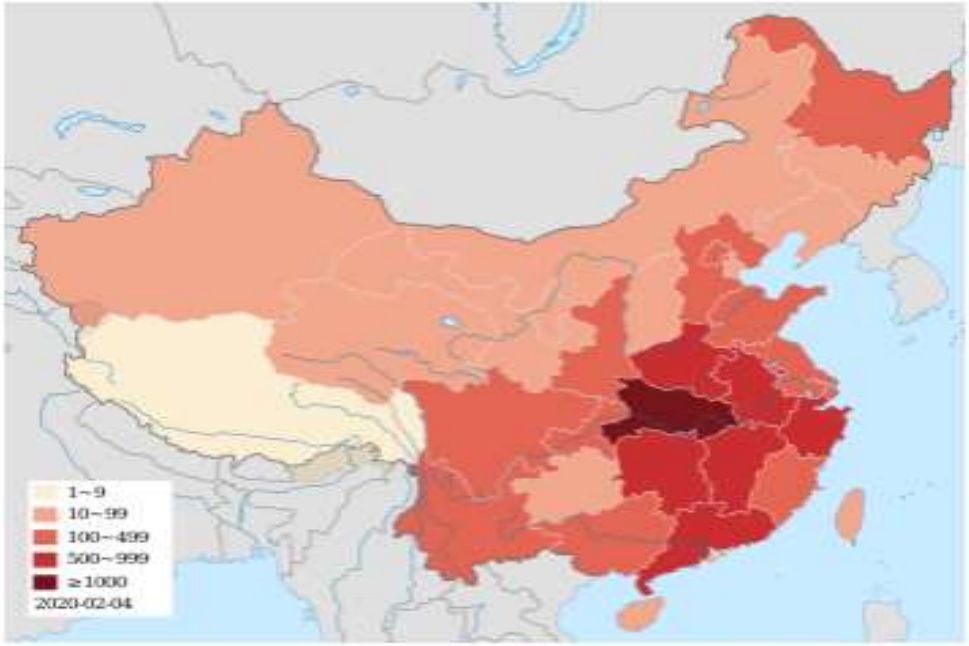


Epidemiology

The first known human infection occurred in early December 2019. An outbreak of 2019-nCoV was first detected in Wuhan, China, in mid-December 2019, likely originating from a single infected animal. The virus subsequently spread to other provinces of Mainland China and other countries, including Thailand, Japan, Taiwan, South Korea, Australia, France, Nepal, India and the United States and more.

- On 30 January 2020, 2019-nCoV was designated a global health emergency by the World Health Organization (WHO).
- First confirmed death was on 9 January 2020.
- As of 5 February 2020, there were 24,604 confirmed cases of infection, of which 24,391 were within mainland China.

Geographic Distribution

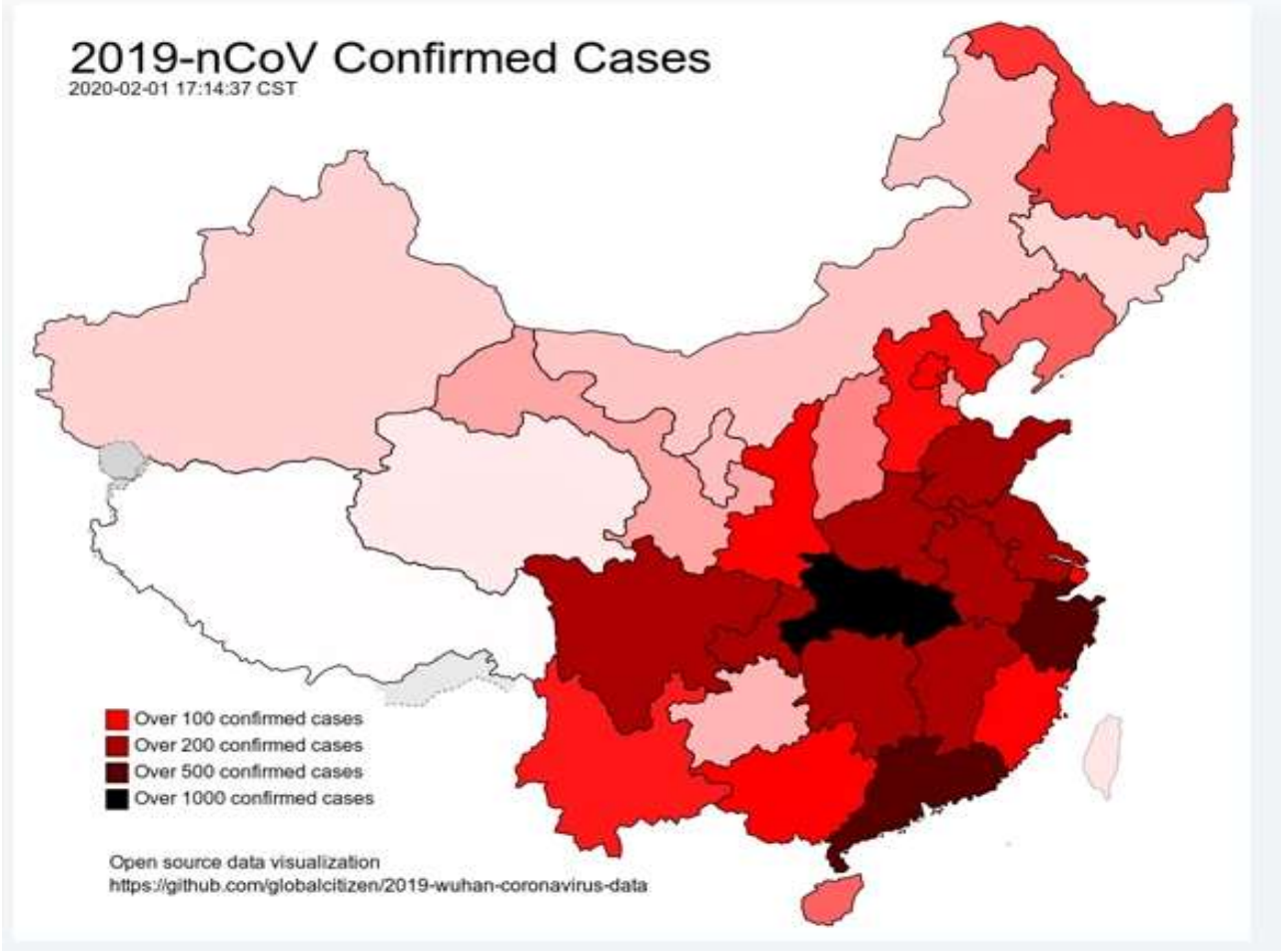


2019-nCoV cases in mainland China, Hong Kong, Macau, and Taiwan[*neutrality is disputed*]

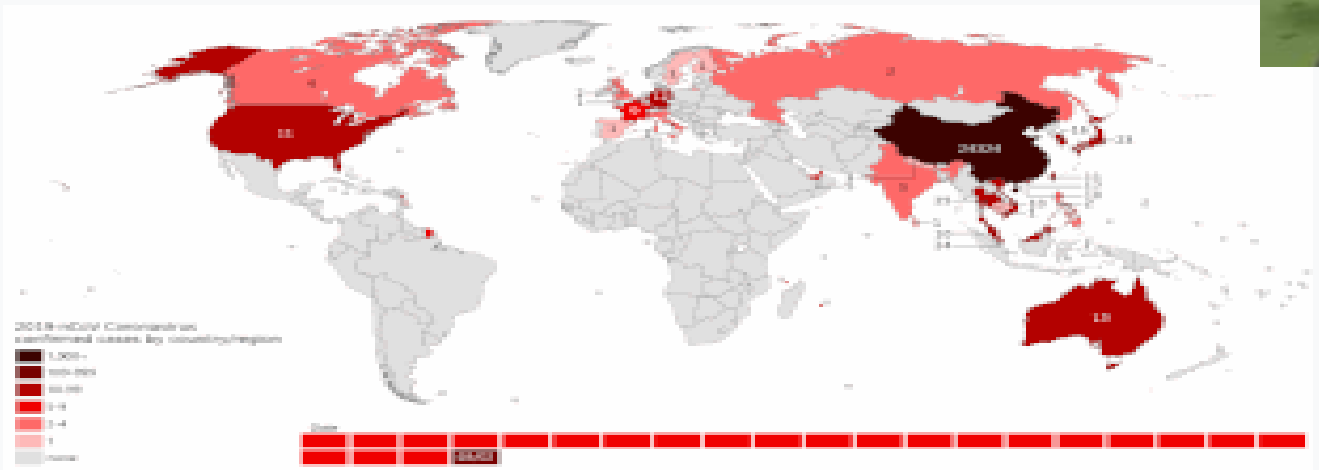
- Confirmed 1–9
- Confirmed 10–99
- Confirmed 100–499
- Confirmed 500-999
- Confirmed ≥1,000

Geographic Distribution

2019-nCoV_Confirmed_Cases_Animated_Map.webm



2019–20 Wuhan coronavirus outbreak



Animated map of confirmed 2019-nCoV cases spreading from 12 January 2020 to 5 February 2020

Date	1 December 2019–ongoing[1][2] (2 months and 4 days)
Location	First identified in Wuhan, Hubei, China[3]

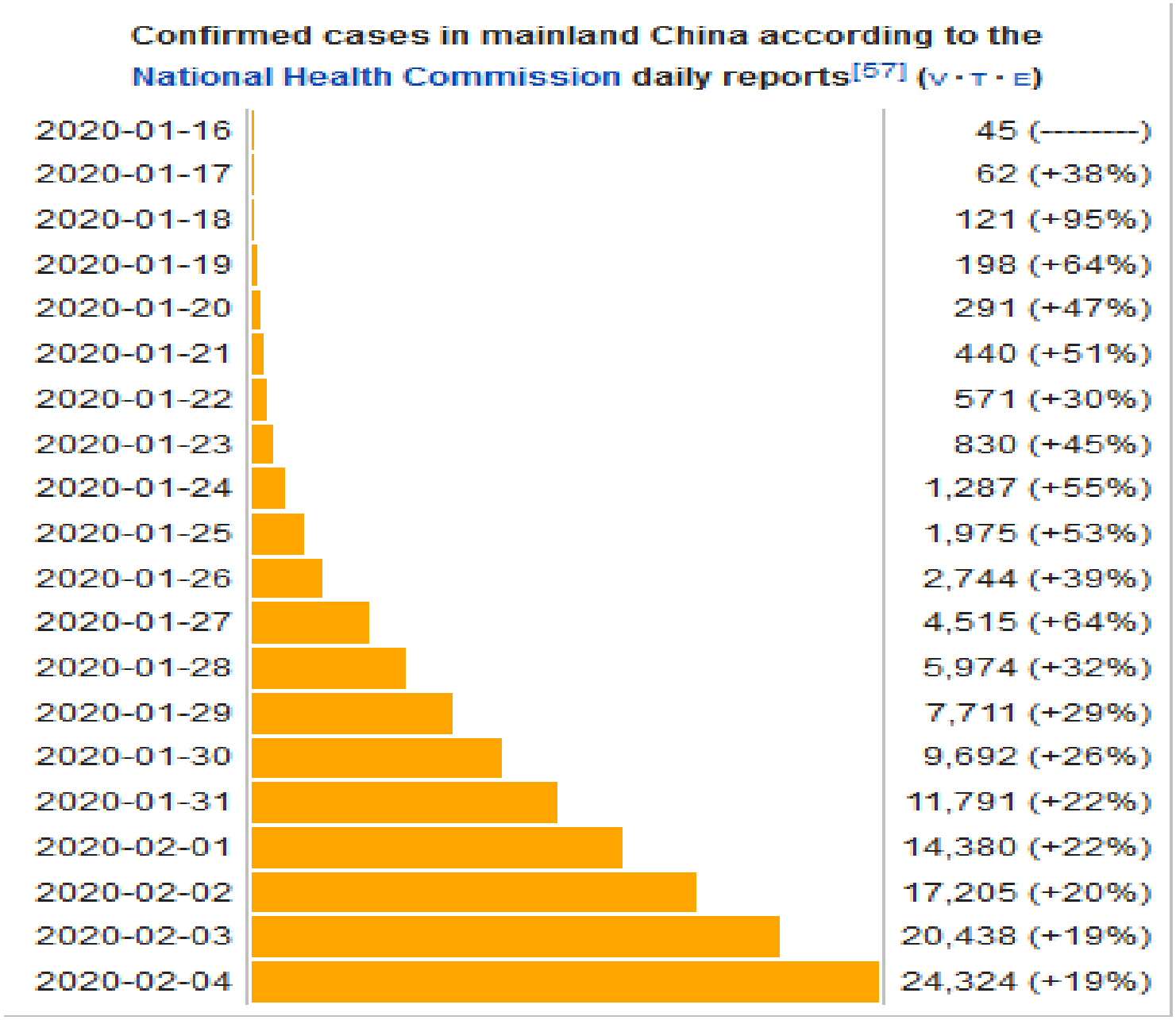
Casualties

As of 5 February 2020[4][5]

Confirmed cases: 24,588[4]

Deaths: 493[4]

Affected territories: 28


Confirmed cases in mainland China according to the National Health Commission daily reports[57] (v · t · e)
2020-01-16 45 (-------)
2020-01-17 62 (+38%)
2020-01-18 121 (+95%)
2020-01-19 198 (+64%)
2020-01-20 291 (+47%)
2020-01-21 440 (+51%)
2020-01-22 571 (+30%)
2020-01-23 830 (+45%)
2020-01-24 1,287 (+55%)
2020-01-25 1,975 (+53%)
2020-01-26 2,744 (+39%)
2020-01-27 4,515 (+64%)
2020-01-28 5,974 (+32%)
2020-01-29 7,711 (+29%)
2020-01-30 9,692 (+26%)
2020-01-31 11,791 (+22%)
2020-02-01 14,380 (+22%)
2020-02-02 17,205 (+20%)
2020-02-03 20,438 (+19%)
2020-02-04 24,324 (+19%)

2019–20 nCoV outbreak by country[58]

Country or region	Confirmed	Deaths	Recoveries	Reference
Mainland China	24,348	491	892	[58]
Japan	33			[58]
Singapore	28		1	[58]
Thailand	25		8	[58]
Hong Kong	21	1		[59]
South Korea	19			[58]
Australia	14		2	[58]
Germany	12			[58]
Malaysia	12			[58]
Taiwan	11			[58]
United States	11			[58]
Macau	10			[58]
Vietnam	10		3	[58]
France	6			[58]
Canada	5			[58]
United Arab Emirates	5			[58]
India	3			[58]
Philippines	3	1		[58]
Italy	2			[58]
Russia	2			[58]
United Kingdom	2			[58]
Belgium	1			[58]
Cambodia	1			[58]
Finland	1			[58]
Nepal	1			[58]
Spain	1			[58]
Sri Lanka	1		1	[58]
Sweden	1			[58]
28 territories	**24,589**	**493**	**907**	

As of 5 February 2020. History: China; Others

Coronavirus 2019-nCoV Global Cases by Johns Hopkins CSSE

Total Confirmed

24,607

Confirmed Cases by Country/Region

- 24,391 Mainland China
- 25 Thailand
- 24 Singapore
- 22 Japan
- 21 Hong Kong
- 16 South Korea
- 13 Australia
- 12 Germany
- 11 US
- 11 Taiwan
- 10 Macau

Country/Region

Last Updated at
2/5/2020, 8:43 PM

Visualization: JHU CSSE. Automation Support: Esri Living Atlas team.
Data sources: WHO, CDC, ECDC, NHC and DXY. Read more in this blog. Contact US.
Downloadable Google Sheet (new link): Here. Time series table: Here. Feature layer: Here.

Total Deaths

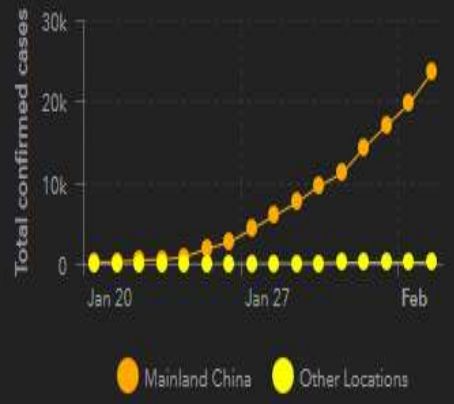
494

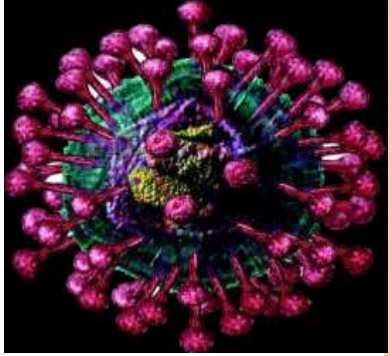
- 479 deaths Hubei Mainland China
- 2 deaths Henan Mainland China
- 2 deaths Chongqing Mainland China
- 1 deaths Sichuan Mainland China
- 1 deaths Beijing Mainland China
- 1 deaths

Total Recovered

1,015

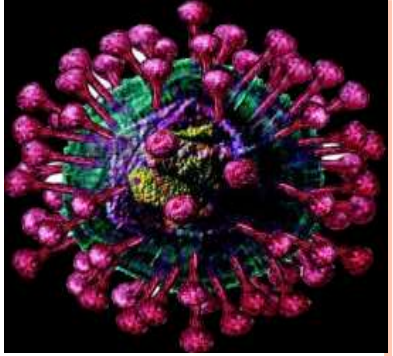
- 537 recovered Hubei Mainland China
- 70 recovered Zhejiang Mainland China
- 53 recovered Hunan Mainland China
- 49 recovered Guangdong Mainland China
- 46 recovered Henan Mainland China





- The suspicion of emergence of new virus arose when a cluster of people in a sea-food market at Wuhan City, China developed pneumonia without any clear cause.
- The virus isolated from the sample is in the same family of viruses SARS-CoV and MERS-CoV
- Genetic homology is about 75-80% with SARS-CoV.

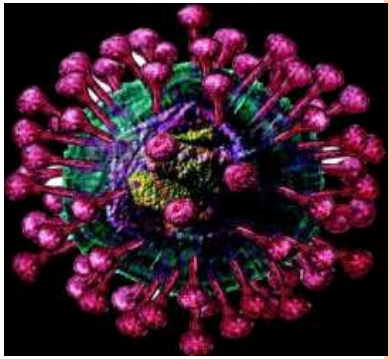
Reservoir

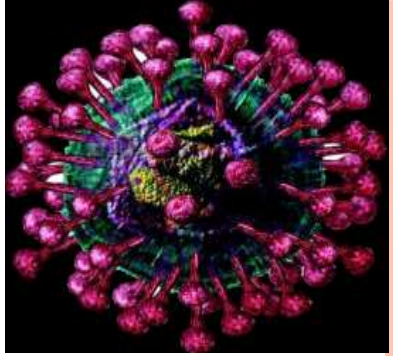


- Animals sold for food are suspected to be the reservoir or the intermediary because many of the first identified infected individuals were workers at the Huanan Sea food Market, Hubei, Wuhan,China.
- A market selling live animals for food was also blamed in the SARS epidemic in 2003
- Researchers confirmed by genomic study,
- **2019-CoV have 96% homology with Bat corona viruses.**

First Transmission of 2019-nCoV was zoonotic

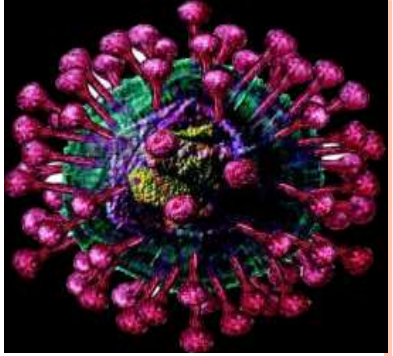
- 2019-nCoV is thought to be a zoonotic virus, as most of the first group of patients were workers or customers of a local whole sale seafood market which also sold live consumable animals, including poultry, donkey, sheep, pig, camels, hedgehogs, snakes etc



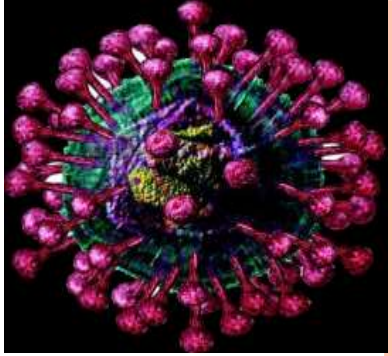


- 2019-nCoV might have jumped from host species bats to snakes and then to humans.
- **Snake is the intermediate host between human and bat.**
- In the animal host viruses undergo repeated mutations to get allowed to transmit to the human
- After reaching the human, person to person transmission is possible.

Mode of transmission

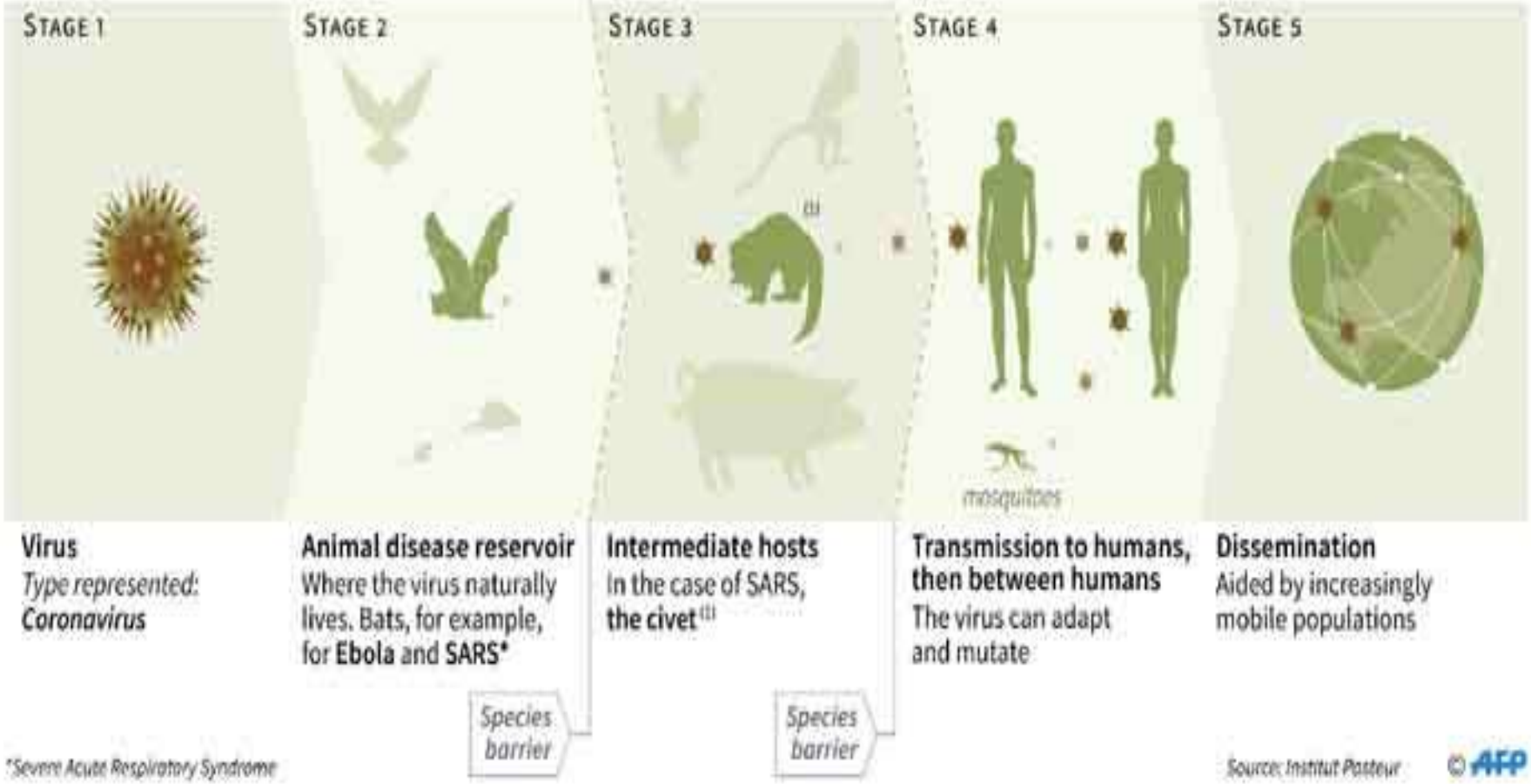


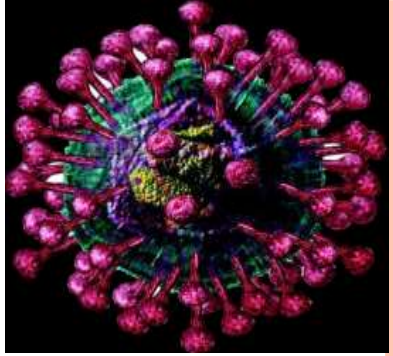
- Human-to-human transmission of the virus has been confirmed. Coronaviruses are primarily spread through close contact, in particular through respiratory droplets from coughs and sneezes within a range of about 6 feet (1.8 m).
- When a person touches a surface or object contaminated with infectious droplets and then touches his or her mouth, nose or eye(s)



- Incubation period 02-14 days
- Viral RNA has also been found in stool samples from infected patients.
- It is possible that the virus can be infectious even during the incubation period but this has not been proven and the WHO states that "transmission from asymptomatic cases is likely not a major driver of transmission" at this time.

From animals to humans: the emergence of a new virus



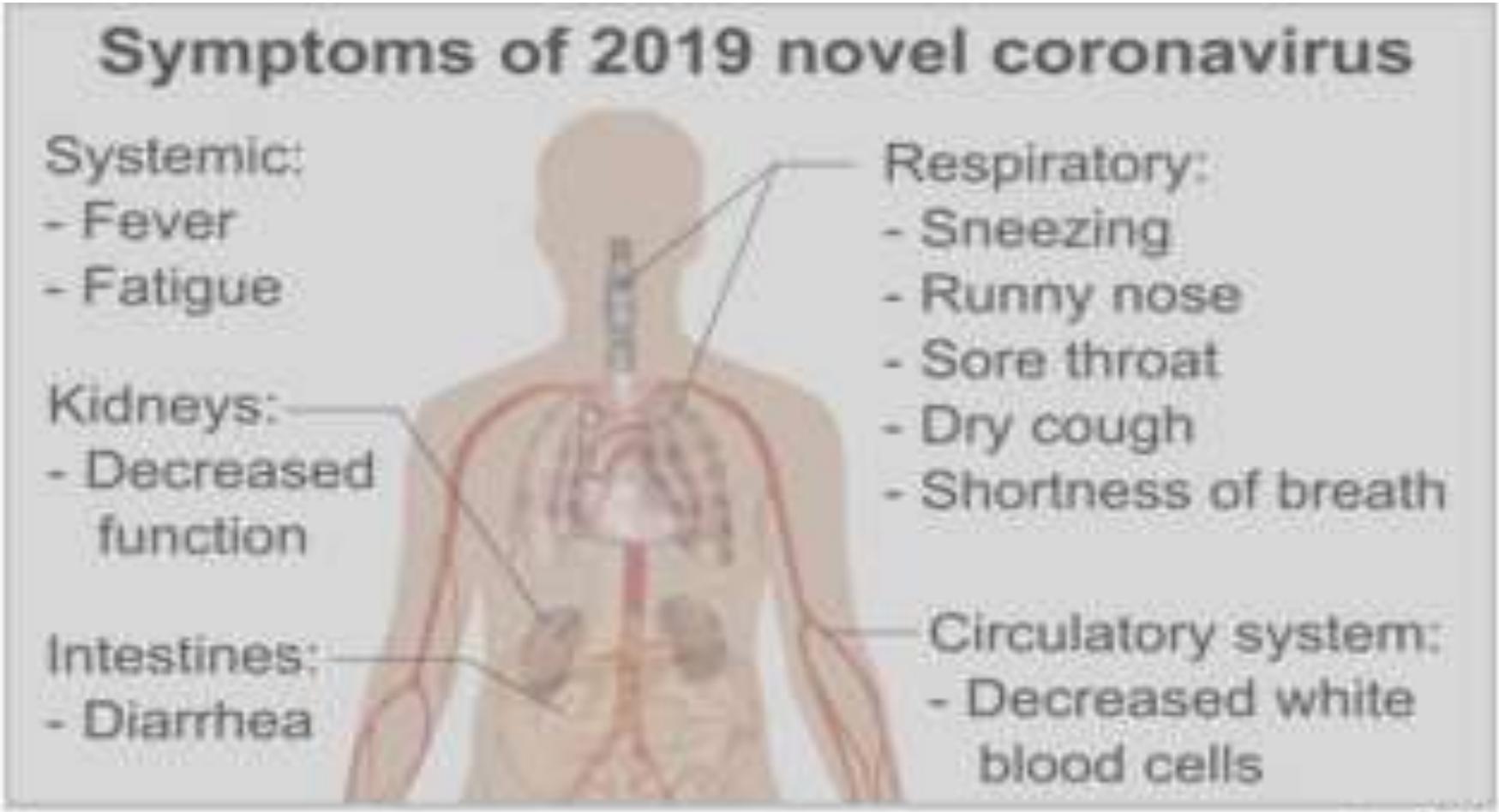


- **The basic reproduction number has been estimated to be 3.11, which means on average an infected person will infect 3 others.**

Signs and symptoms

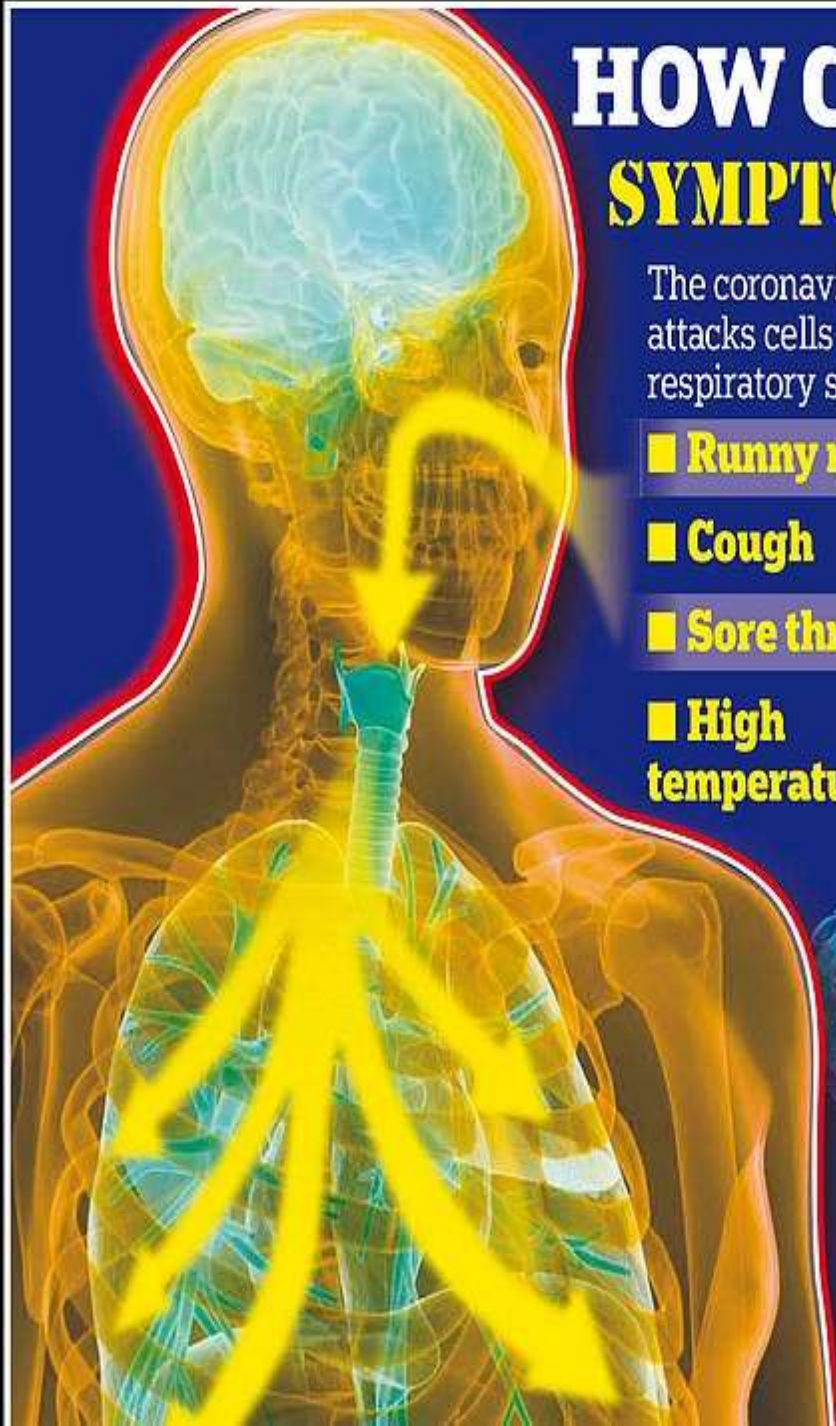
Those infected may be asymptomatic or have mild to severe symptoms like fever, cough, shortness of breath, and diarrhoea. The time from exposure to onset of symptoms is estimated at 2 to 10 days by the World Health Organization and 2 to 14 days by the US Centers for Disease Control and Prevention (CDC). Upper respiratory symptoms such as sneezing, a runny nose or sore throat are less frequent.

Cases of severe infection can result in pneumonia, kidney failure and death. Many of those who died had other conditions such as hypertension, diabetes, or cardiovascular disease that impaired their immune systems.



Symptoms of 2019-nCoV (2019 novel coronavirus). There are reports that it may spread even without symptoms.[8a]

HOW CORONAVIRUS CAN KILL



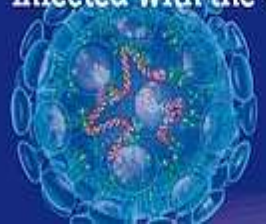
SYMPTOMS

The coronavirus attacks cells in the respiratory system

- Runny nose
- Cough
- Sore throat
- High temperature

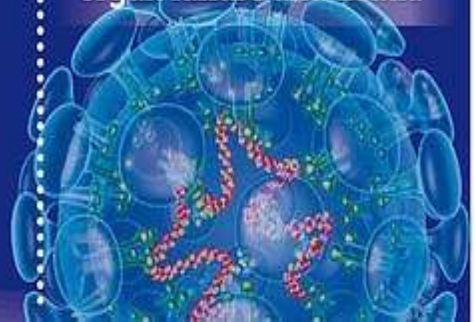
SPREAD

- Novel coronavirus first spread to humans from an animal – thought to be a snake – at the South China Seafood Wholesale Market.
- The virus is transmitted between humans in droplets from coughing and sneezing and touching or shaking hands.
- It enters humans through the nose and mouth, then finds a 'host cell' in the respiratory system, such as one in the nose. The host cell then bursts and other nearby cells in the body are infected with the virus.

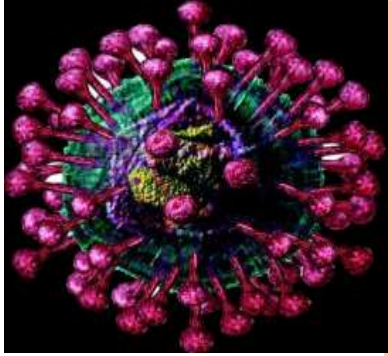


DEATH

- Most victims die from complications including pneumonia and from swelling in the lungs.
- Severe pneumonia can kill people by causing them to 'drown' in the fluid flooding their lungs.
- The virus also causes swelling in the respiratory system, which can make it hard for the lungs to pass oxygen into the bloodstream – leading to organ failure and death.



Estimates



- Researchers at Northeastern University and Imperial College London estimated that **the number of actual infections maybe 10 times higher than those confirmed .**

Diagnosis

The WHO has published several testing protocols for 2019-nCoV. Testing uses **real time reverse transcription-polymerase chain reaction (rRT-PCR).** The test can be done on respiratory or blood samples. Results are generally available within a few hours to days.

PICTURE OF CDC'S LABORATORY TEST KIT FOR THE 2019 NOVEL CORONAVIRUS (2019-NCOV)

Management

There were no effective medications or vaccines against 2019-nCoV, though development efforts were underway. Attempts to relieve the symptoms include taking regular (over-the-counter) flu medications, drinking fluids and resting. Oxygen therapy, intravenous fluids and breathing support may be required.

Experimental treatment

The NHC, recommends patients be given two lopinavir & ritonavir twice a day & a dose of alpha interpheron through nebulization twice daily.

In China treatment are given as follows :

- ✓ Tamiflu (Oseltamivir) antiviral therapy:

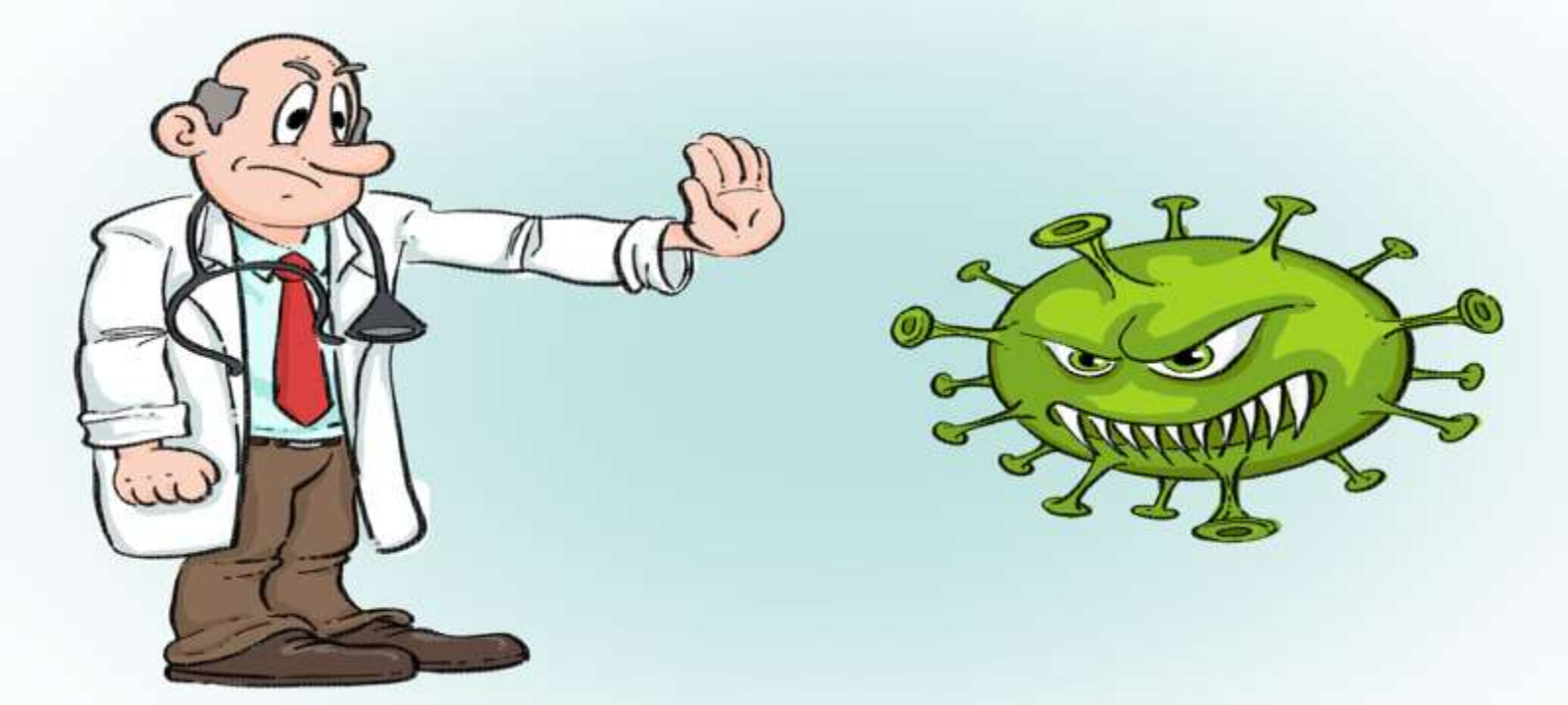
  it may help to reduce symptoms. It must be taken within 48 hours of onset of symptom otherwise it does not work.

- ✓ Antibiotic
- ✓ Corticosteroid
- ✓ O2 support

Complication

- Acute respiratory distress syndrome
- Anaemia
- Acute cardiac injury
- Acute kidney injury
- Secondary infection

Prevention



Reduce your risk of coronavirus infection:

Clean hands with soap and water or alcohol-based hand rub

Cover nose and mouth when coughing and sneezing with tissue or flexed elbow

Avoid close contact with anyone with cold or flu-like symptoms

Thoroughly cook meat and eggs

No unprotected contact with live wild or farm animals

World Health Organization

Wash your hands

Wash your hands with soap and running water when hands are visibly dirty

If your hands are not visibly dirty, frequently clean them by using alcohol-based hand rub or soap and water

World Health Organization

Protect yourself and others from getting sick

Wash your hands

- after coughing or sneezing
- when caring for the sick
- before, during and after you prepare food
- before eating
- after toilet use
- when hands are visibly dirty
- after handling animals or animal waste

World Health Organization

Protect others from getting sick

When coughing and sneezing **cover mouth and nose** with flexed elbow or tissue

Throw tissue into closed bin immediately after use

Clean hands with alcohol-based hand rub or soap and water after coughing or sneezing and when caring for the sick

World Health Organization

Protect others from getting sick

Avoid close contact when you are experiencing cough and fever

Avoid spitting in public

If you have fever, cough and difficulty breathing **seek medical care early** and share previous travel history with your health care provider

World Health Organization

Practise food safety

Use different chopping boards and knives for raw meat and cooked foods

Wash your hands between handling raw and cooked food.

World Health Organization

Practise food safety

Even in areas experiencing outbreaks, meat products can be safely consumed if these items are cooked thoroughly and properly handled during food preparation.

World Health Organization

Shopping in wet markets in China and Southeast Asia? Stay healthy!

Wash hands with soap and water after touching animals and animal products

Avoid touching eyes, nose and mouth

Avoid contact with sick animals and spoiled meat

Avoid contact with stray animals, waste and fluids in market

World Health Organization

Working in wet markets in China and Southeast Asia? Stay healthy!

Wear protective gowns, gloves and facial protection while handling animals and animal products

Remove protective clothing after work, wash daily and leave at the work site

Avoid exposing family members to soiled work clothing and shoes

World Health Organization

Working in wet markets in China and Southeast Asia? Stay healthy!

Frequently wash your hands with soap and water after touching animals and animal products

Disinfect equipment and working area at least once a day

World Health Organization

STAY HEALTHY WHILE TRAVELLING

Avoid travel if you have a fever and cough

If you have a fever, cough and difficulty breathing seek medical care early and share previous travel history with your health care provider

World Health Organization

STAY HEALTHY WHILE TRAVELLIN

Avoid close contact with people suffering from a fever and cough

Frequently clean hands using alcohol-based hand rub or soap and w

Avoid touching eyes, nose or mouth

World Health Organization

STAY HEALTHY

WHILE TRAVELLING

When coughing and sneezing cover mouth and nose with flexed elbow or tissue – throw tissue away immediately and wash hands

If you choose to wear a face mask, be sure to cover mouth and nose - avoid touching mask once it's on

Immediately discard single-use mask after each use and wash hands after removing masks

World Health Organization

STAY HEALTHY

WHILE TRAVELLING

If you become sick while travelling, inform crew and seek medical care early

If you seek medical attention, share travel history with your health care provider

World Health Organization

STAY HEALTHY WHILE TRAVELLING

Eat only well-cooked food

Avoid spitting in public

Avoid close contact and travel with animals that are sick

World Health Organization

VACCINE RESEARCH

- In China, the Chinese Center for Disease Control and Prevention is developing a vaccine against the novel coronavirus.
- University of Hong Kong, which previously participated in work on the SARS coronavirus during its 2003 outbreak, has also announced that a vaccine is under development there but has yet to proceed to animal testing.

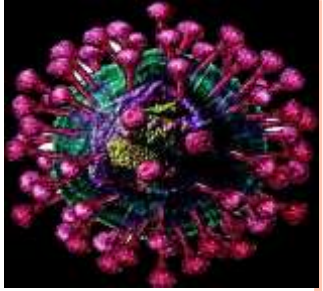
- The United States National Institutes of Health (NIH) is cooperating with Moderna to create an RNA vaccine matching a spike of the coronavirus surface, and is hoping to start production by May 2020.
- In Australia, the University of Queensland is investigating the potential of a molecular clamp vaccine that would genetically modify viral proteins to make them mimic the coronavirus and stimulate an immune reaction.

- The International Vaccine Centre (VIDO-InterVac) at the University of Saskatchewan to begin work on a vaccine. VIDO-InterVac aims to start production and animal testing in March 2020, and human testing in 2021.
- The Imperial College Faculty of Medicine in London has funding to develop a vaccine and take it to animal testing, a phase of research it expects to complete by mid-February 2020.

Prognosis

The overall case fatality rate appears to be approximately 3% based on initial case reports; however, the true number of infections and disease course are still unknown at this time. Most of those who died were older and/or had underlying health conditions. Case fatality rates were approximately 37% for MERS and 10% for SARS.

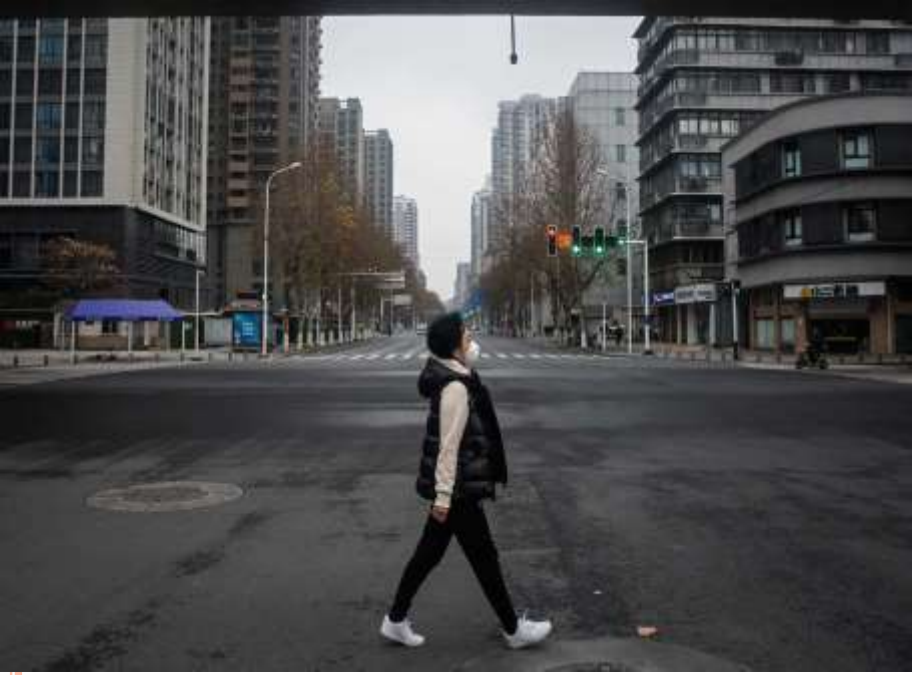
What China is doing to contain 2019-nCoV



- The country has put **16 cities on lockdown, keeping about 46 million people quarantine.**
- Extension of new year holidays
- Educational institutes kept suspended up to mid February
- More provinces and cities outside the most contaminated Hubei started to restrict travel.

A medical staff member takes the temperature of a man at the Wuhan


60




AFP
There used to be a lot of people on the streets, many people,
FOLLOW US


雨雪雾
谨慎驾


Wuhan, Hubei province, China
January 28, 2020
Wuhan has been left deserted amid
the deadly coronavirus outbreak
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田家营村
发热，速到发热门诊就诊。请广大


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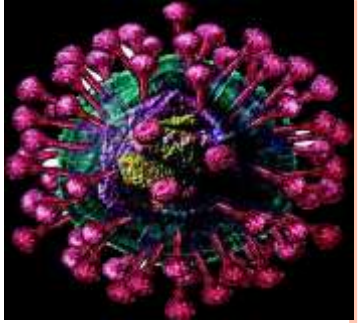
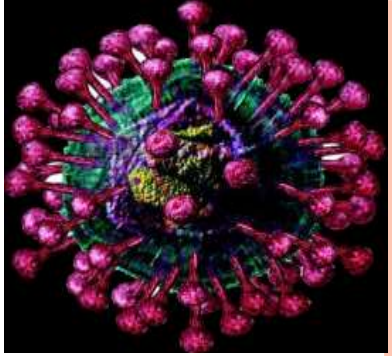


- Since 31 December 2019, some regions and countries near China tightened their screening of selected travellers.
- People with fevers are subsequently taken to medical institutions after being registered and given masks.
- Real time Reverse Transcription-Polymerase Chain Reaction (rRT-PCR) test was used to confirm new cases.

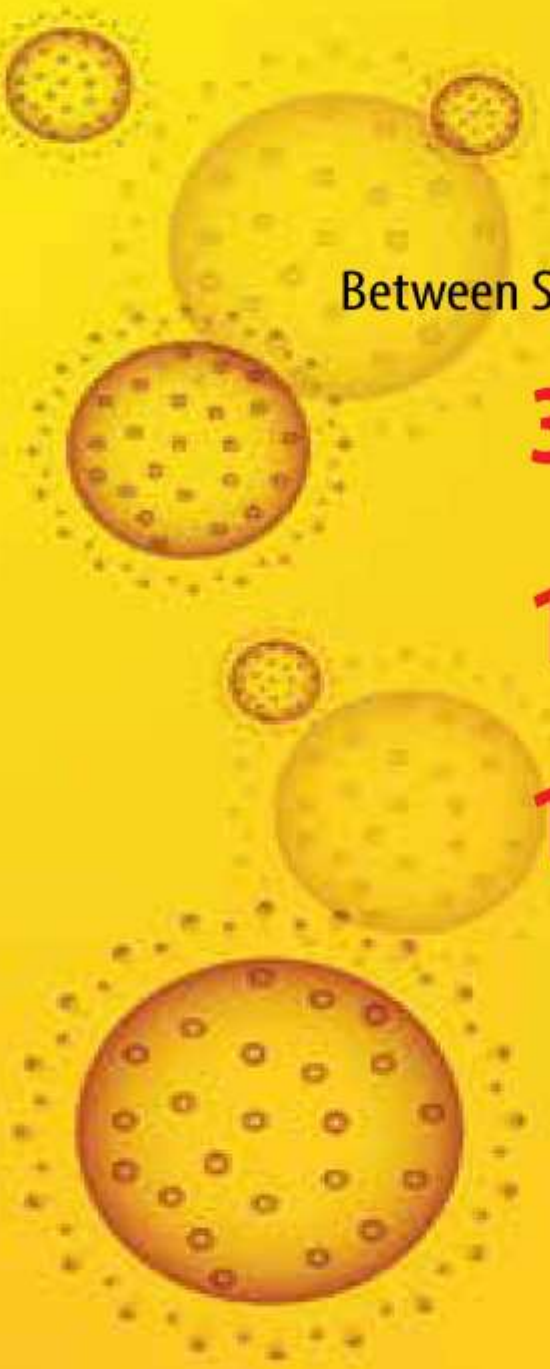
Situation in Bangladesh



- No confirmed cases are found in Bangladesh.
- Still, we are in vulnerable situation
- Emergence of 2019-nCoV will cause an ultimate massacre in our densely populated country
- The IEDCR has launched four hotlines for creating awareness among people about the epidemic. The numbers are: 0193711001l, 01937000011, 01927711784 and 01927711785.

An isolated unit was opened on the ground floor of unit -2 of DMCH for handling any possible coronavirus outbreak

CORONAVIRUS SITUATION IN BANGLADESH



Between Sat and Sun, 8am		From January 21 till now
302	Passengers from China screened at airport	5631
150	Total calls received at IEDCR hotline	468
127	Total calls to IEDCR hotline	253
6	No of service seekers to IEDCR	28
0	Total samples examined for coronavirus	34

Source: IEDCR

Study on Corona virus outbreak

Age, years	
Mean (SD)	55·5 (13·1)
Range	21–82
≤39	10 (10%)
40–49	22 (22%)
50–59	30 (30%)
60–69	22 (22%)
≥70	15 (15%)
Sex	
Female	32 (32%)
Male	67 (68%)
Occupation	
Agricultural worker	2 (2%)
Self-employed	63 (64%)
Employee	15 (15%)
Retired	19 (19%)
Exposure to Huanan seafood market*	49 (49%)
Long-term exposure history	47 (47%)
Short-term exposure history	2 (2%)

Signs and symptoms at admission	
Fever	82 (83%)
Cough	81 (82%)
Shortness of breath	31 (31%)
Muscle ache	11 (11%)
Confusion	9 (9%)
Headache	8 (8%)
Sore throat	5 (5%)
Rhinorrhoea	4 (4%)
Chest pain	2 (2%)
Diarrhoea	2 (2%)
Nausea and vomiting	1 (1%)
More than one sign or symptom	89 (90%)
Fever, cough, and shortness of breath	15 (15%)
Comorbid conditions	
Any	33 (33%)
ARDS	17 (17%)
Acute renal injury	3 (3%)
Acute respiratory injury	8 (8%)
Septic shock	4 (4%)
Ventilator-associated pneumonia	1 (1%)

Chest x-ray and CT findings	
Unilateral pneumonia	25 (25%)
Bilateral pneumonia	74 (75%)
Multiple mottling and ground-glass opacity	14 (14%)
Treatment	
Oxygen therapy	75 (76%)
Mechanical ventilation	
Non-invasive (ie, face mask)	13 (13%)
Invasive	4 (4%)
CRRT	9 (9%)
ECMO	3 (3%)
Antibiotic treatment	70 (71%)
Antifungal treatment	15 (15%)
Antiviral treatment	75 (76%)
Glucocorticoids	19 (19%)
Intravenous immunoglobulin therapy	27 (27%)

2019-nCoV=2019 novel coronavirus. ARDS=acute respiratory distress syndrome. ECMO=extracorporeal membrane oxygenation. CRRT=continuous renal replacement therapy.

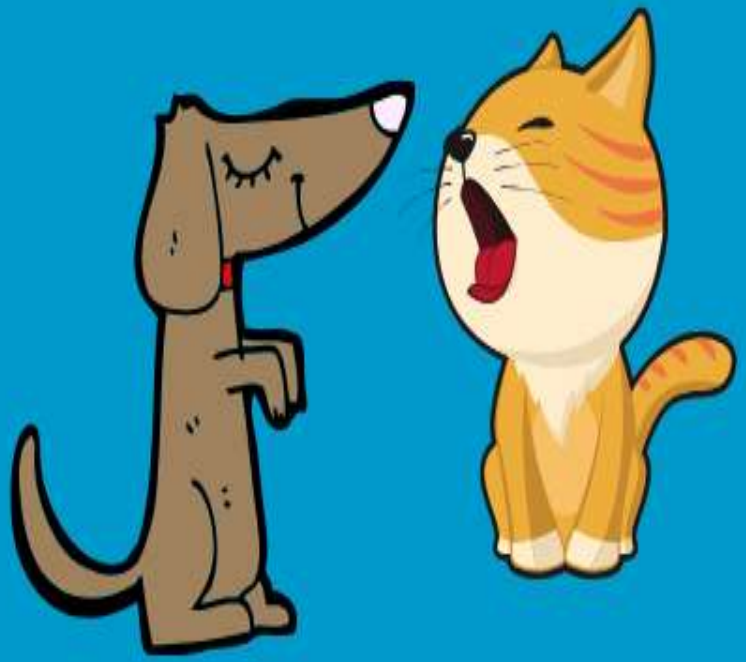
Chronic medical illness	50 (51%)
Cardiovascular and cerebrovascular diseases	40 (40%)
Digestive system disease	11 (11%)
Endocrine system disease†	13 (13%)
Malignant tumour	1 (1%)
Nervous system disease	1 (1%)
Respiratory system disease	1 (1%)
Admission to intensive care unit	23 (23%)
Clinical outcome	
Remained in hospital	57 (58%)
Discharged	31 (31%)
Died	11 (11%)

Data are n (%) unless specified otherwise. 2019-nCoV=2019 novel coronavirus. *Long-term exposure is having worked at or lived in or around Huanan seafood market, whereas short-term exposure is having been to Huanan seafood market occasionally. †12 were diabetic.

Some common query

Can pets at home spread the new coronavirus (2019-nCOV)?

At present, there is no evidence that companion animals / pets such as dogs or cats can be infected with the new coronavirus. However, it is always a good idea to wash your hands with soap and water after contact with pets. This protects you against various common bacteria such as E. coli and Salmonella that can pass between pets and humans.



World Health Organization

#Coronavirus

Does the new coronavirus affect older people, or are younger people also susceptible?

People of all ages can be infected by the new coronavirus (nCoV-2019).

Older people, and people with pre-existing medical conditions (such as asthma, diabetes, heart disease) appear to be more vulnerable to becoming severely ill with the virus.

WHO advise people of all age to take steps to protect themselves from the virus, for example by following good hand hygiene and good respiratory hygiene.

World Health Organization

#Coronavirus

Are there any specific medicines to prevent or treat the new coronavirus?

To date, there is no specific medicine recommended to prevent or treat the new coronavirus (2019-nCoV).

However, those infected with the virus should receive appropriate care to relieve and treat symptoms, and those with severe illness should receive optimized supportive care.

Some specific treatments are under investigation, and will be tested through clinical trials.

WHO is helping to accelerate research and development efforts with a range of partners.

World Health Organization

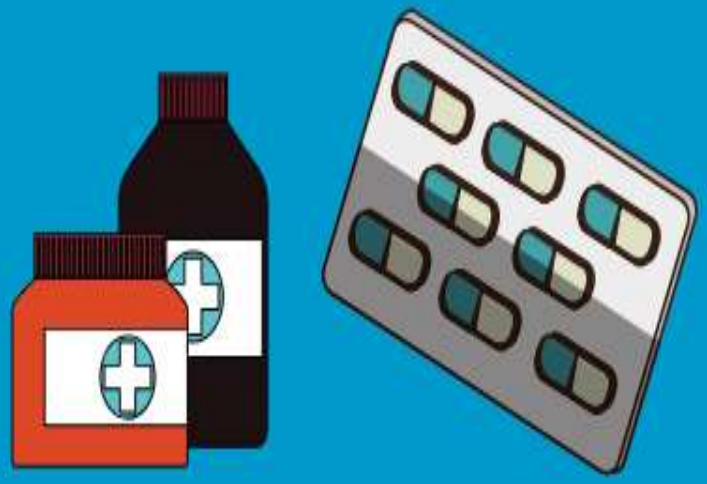
#Coronavirus

Are antibiotics effective in preventing and treating the new coronavirus?

No, antibiotics do not work against viruses, only bacteria.

The new coronavirus (2019-nC0V) is a virus and, therefore, antibiotics should not be used as a means of prevention or treatment.

However, if you are hospitalized for the 2019-nCoV, you may receive antibiotics since bacterial co-infection is possible.



World Health Organization

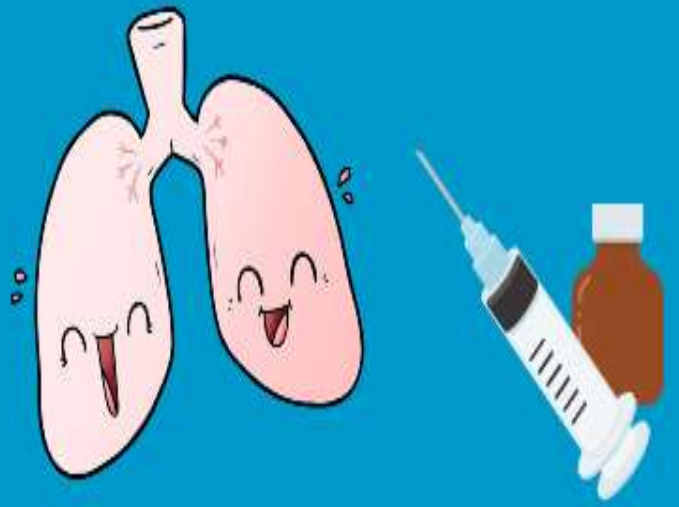
#Coronavirus

Do vaccines against pneumonia protect you against the new coronavirus?

No. Vaccines against pneumonia, such as pneumococcal vaccine and Haemophilus influenza type B (Hib) vaccine, do not provide protection against the new coronavirus.

The virus is so new and different that it needs its own vaccine. Researchers are trying to develop a vaccine against 2019-nCoV, and WHO is supporting their efforts.

Although these vaccines are not effective against 2019-nCoV, vaccination against respiratory illnesses is highly recommended to protect your health.



World Health Organization

#2019nCoV

Is it safe to receive a letter or a package from China?

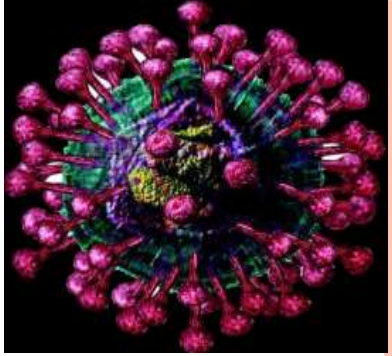
Yes, it is safe. People receiving packages from China are not at risk of contracting the new coronavirus.

From previous analysis, we know coronaviruses do not survive long on objects, such as letters or packages.

World Health Organization

#2019nCoV

TAKE HOME MESSAGE



- Preventive measures is only protective approach of population to avoid 2019-nCoV.
- No specific treatment yet available, Vaccine under animal trial.
- **Don’t panic! Get informed. Be prepared.**


THANK YOU