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# An extensive study on the COVID-19 pandemic, an emerging global crisis: Risks, transmission, impacts and mitigation

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ABSTRACT

A number of unexplained cases of pneumonia have been recorded since November 2019 in China. It is officially named the new corona virus (2019-nCov) by the World Health Organization on 12 January 2020. WHO officially named it COVID-19 on 11 February. COVID-19 is a highly transmitted and pathogenic viral infection that has been developed and spread across the world in Wuhan, China, caused by extreme acute respiratory syndrome corona-virus 2 (SARS-CoV-2). Genomic analysis showed that bats may also be a primary reservoir of SARS-CoV-2 phylogenetically associated with severe acute respiratory syndrome-like viruses (SARS). However, the rapid human to human transition has been generally reported. Intermediate source of origin and human transition is unknown. Clinically approved COVID-19 antiviral medication or vaccine is not available. In clinical trials, however, few broad-based COVID-19 antiviral medicinal drugs were tested, resulting in clinical recovery. This analysis summarizes the pathogenicity of COVID-19 and aims to raise awareness of COVID-19 among the population and to continually boost the detection, monitoring, diagnosis and care level. Over 50 COVID-19 scientific publications were included in this systematic analysis. We found that fever (87.0%), cough (65.9%) and malaise/tiredness (35%) were the most common symptoms of COvida-19. However, COVID-19 clinical signs and symptoms were not necessarily obvious. The transmission of COVID-19 in comparison to SARS was more specific. The rate of death of COVID-19 was 2,7% and the pathological characteristics of COVID-19 are very similar to ARDS. There are also discussions on the latest epidemiological changes, clinical manifestations, auxiliary examination and COVID-19 pathological characteristics.



**Contents**



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## Introduction

Corona viruses belong to the Coronaviridae family in the Nidoviralesorder. There is a spike on the exterior surface of the virus like the crown and was thus referred to as the corona virus. Scale (65–125 nm in diameter) of corona viruses is minute; as a nucleic material, they are containing single stranded RNA of 26–32 kbs of length as shown in Fig. 1 below. Subgroups of coronary virus include alpha (a), beta (b), gamma (c) and crown delta (d). ARS-CoV Extreme, H5N1 influenza A, H1N1 2009, and Respiratory Syndrome of the Middle East (MERS-CoV), which contributes to lung failure and death, causes acute lung damage and acute respiratory distress (ARDS) syndrome. Below was the basis for a better understanding of the corona virus (Cov-19) and SARS (Fig. 2) [1–3]. These viruses were thought to infect only animals until a significant outbreak of SARS-CoV in 2002 in Guangdong, China occurred worldwide. Just 10 years later, a pathogenic corona virus, known as the corona virus (MERS-CoV) of the Middle East, triggered an pandemic one.

Wuhan, China's new corona virus business center, has recently killed more than 1800 people and infected more than 70,000 in

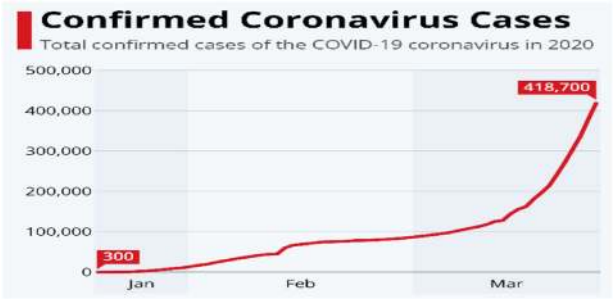


**Fig. 3.** Total confirmed cases as on March, 2020.

the beginning of 50 days following the 2019 outbreak. A category B corona virus was found to be a virus [2,3]. The new virus has been referred to by Chinese researchers as the Wuhan corona virus (2019-nCov). The International Virus Taxonomy Committee (ICTV) was named SARS-CoV-2 and COVID-19. Over the course of history, 8098 people suffered 9% from SRAS-CoV and 2,9% from the most

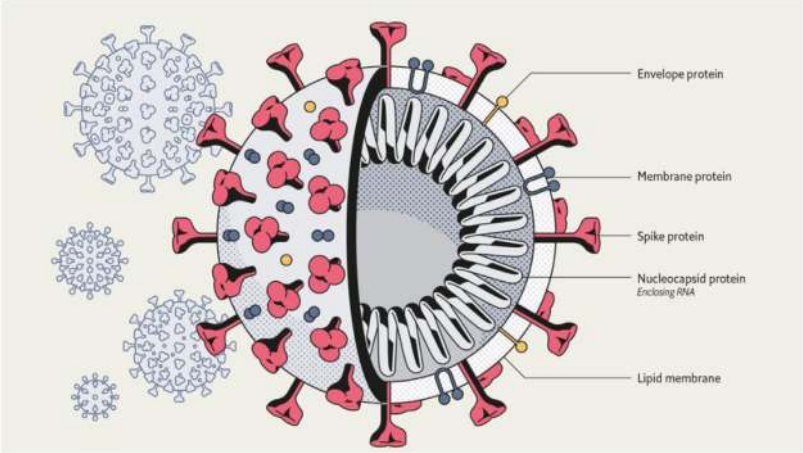


**Fig. 1.** Basic structure of corona virus.

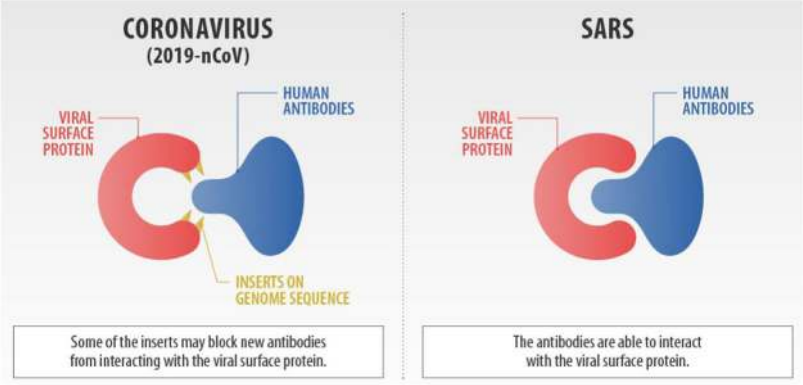


**Fig. 2.** Basic difference between Cov-19 and SARS.

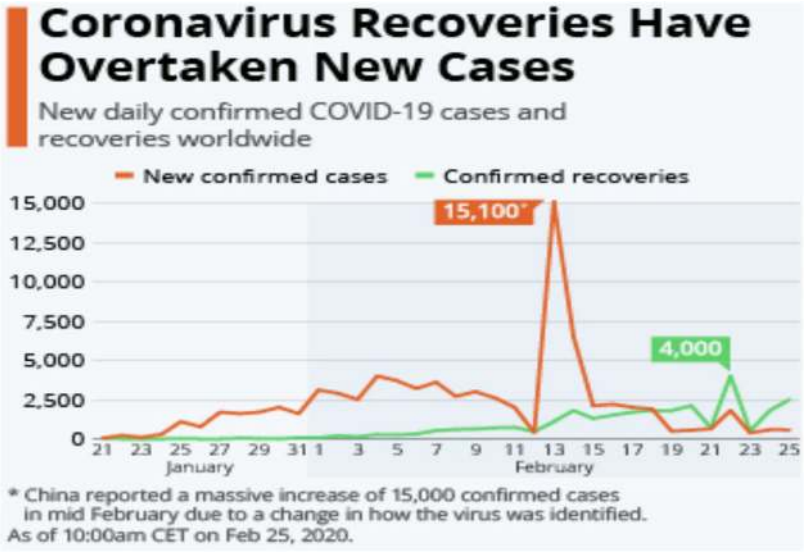


**Fig. 4.** Corona virus recovery plot.

recent corona virus (2019), which was in 26 countries worldwide (2003) and 120,000 from 109 countries (2017). Full confirmed cases (Fig. 3) were shown below by March 2020 [4–7].

It indicates that the SARS-CoV-2 transmission rate is higher than SRAS-CoV and may have increased the transmission ability for S-protein genetic recombination event in the SARS-CoV-2 RBD Region [7,8]. We are briefly exploring the origin of human corona viruses in this review article. We further address SARS and MERS with a special emphasis on COVID-19, which link infectiousness and biological properties.

The recovery rate of viruses shows in Fig. 4 and cases reported worldwide in CODVID-19 are shown in Fig. 5. In the past two decades, two incidents have caused serious illness caused by a crossover of animal beta-corona viruses to human beings. The first such example occurred in 2002–2003 when a new β-generated corona virus with a human bat origin passed through an intermediate host of palm civet cats in the Guangdong provinces of China. The viruses known as extreme acute respiratory corona were infected by 8422 people, mainly in China and Hong Kong; before infection, 916 people died (11 per cent mortality rate). In 2012, approximately 10 years later, the bat roots of the Middle East Respiratory Syndrome (MERS-CoV) was developed into a medium home with dromedary camels, affecting 2494 persons in Saudi Arabia. This article provides a view from the eye of a bird of this emerging virus. Because this virus is becoming increasingly known, readers should update themselves regularly [8–10].

*Origin and spread of corona virus*

The local hospitals in the capital of Hubei province of Wuhan and a major transport hub in China started to develop serious, unaccountable pneumonia in December 2019. In many initial cases, live animals were also commonly exposed to the wholesale marine market in Huanan. The surveillance system was activated after the SARS outbreak and patients were given respiratory samples to reference laboratories for etiological investigation. On 31 December, 2019, China reported the outbreak to the World Health Organization, and closed Huanan's marine food market on 1 January, 2019. The environmental samples also proved to be positive in the case of the Huana Maritime Food market, which showed that the virus originated in the area [11–13]. The origin schema is shown in Fig. 6 below. On 7 January, Coronabulus was found to have >95% homology of Bat Corona (Coronabulus), and >70% SARS CoV similarity. The number of cases started to grow exponentially, as some were not exposed to live animal markets, showing a human-to-human transmission. The first case of death was reported on 11 January 2020. Mass migration from China fueled the pandemic during the Chinese New Year. For people who returned from Wuhan, cases were reported in other Chinese provinces, with other countries in succession (Thailand, Japan and South Korea) [13].

The delivery to caregivers was described on 20 January, 2020. By 23 January the people of Wuhan were confined to restrictions on access and exit from the region by 11 million. This lock was soon extended to other villages in the Hubei province. COVID-19 reports in countries outside of China show that there has been local human-to-human transmission without a travel history to China. Screening systems were used in airports in various countries, including India, to detect and isolate China-born symptomatic people and tested COVID-19. Asymptomatic people soon became clear that an infection can be transmitted, even before symptoms start [14]. Countries, including India, have therefore placed all people in 14 d-symptoms or tested and isolated from their citizens by special flights from the Wuhan or have had travellers from China come back from there [15].

Cases continued exponentially to increase, and epidemic doubling times of 1.8 were reported by modelling studies. Indeed, on 12 February Chinese patients with negative and pendent molecular tests but clinical, radiological and epidemiological characteristics of COVID-19 have changed their definition to include patients with confirmation cases that will increase by 15,000 in a single day. 96,000 cases (80,000 in China) worldwide and 87 countries and one international transportation (696, parked off the coast of Japan on a ship of cruise ship Diamonds Princess) were reported as of 05/03/2020 [16]. It is important to note that, even though in China the number of new cases has decreased lately, in other countries such as South Korea, Italy and Iran they have increased exponentially. 20% (3013 in China and 297 in other countries) of these infected people are in critical condition and 25% are recovered. 3310 of them died. The case also showed a sudden spurt in India, which had reported only 4 cases up until 3/3/2020. By 6/3/2020, 35 cases were reported; in Italian tourists and their contacts, mostly in Delhi, Jaipur and Agra. An Indian who travelled from Vienna and showed a large number of school children at a birthday party in a town hotel was reported as having one case. Many of these cases' con-

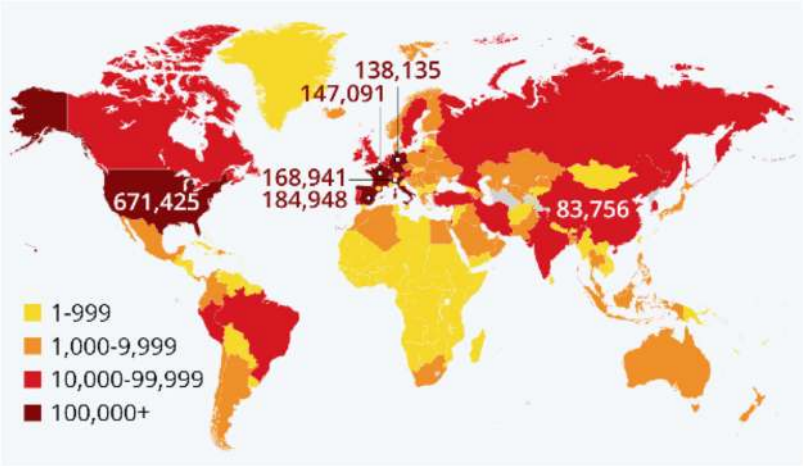


**Fig. 5.** CODVID-19 confirmed cases by location around world wide.

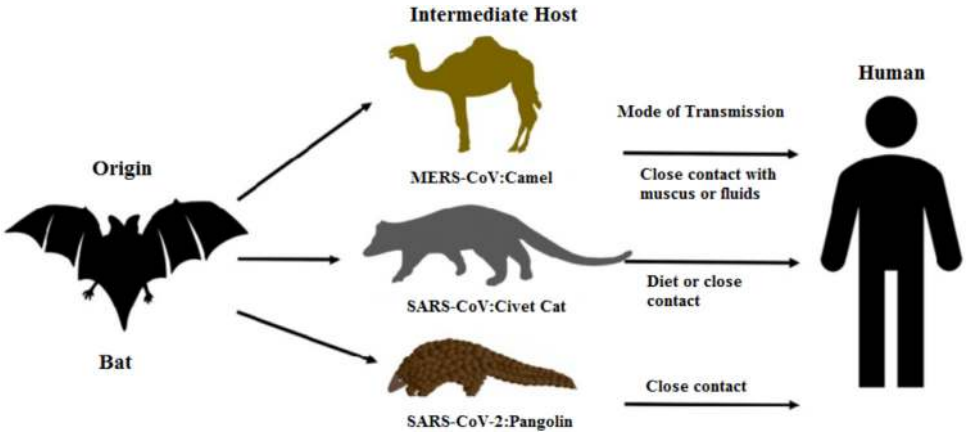


**Fig. 6.** Origin and mode of transmission of SARS-CoV-2.

tacts were quarantined. These numbers can be an underestimation of the infected and dead because of monitoring and testing limitations. While SARS-CoV-2 originated from bats, it is uncertain what intermediate animal it passed over to humans. The current suspects are pangolins and snakes [17–21].

*Sources of SARS-CoV-2*

It is a corona virus which is included in the cluster β-corona. The third known disorder after SARS and the Respiratory Syndrome of the Middle East (MERS) is COVID-19. Also included in the β-corona virus cluster were SARS-CoV and MERS-CoV. In Zhu et al., the new β-corona virus was confirmed in Coronaviridae subgene. CoV-2 of SARS. The early case of COVID-19 was linked to the Marine Market in Huanan and the possibilities of human transmission cannot be excluded according to current data [22]. The WHO report argues that sARS-CoV-2 can be recognized under environmental circumstances in marine samples collected but it has not yet been determined whether it is in SARS-CoV-2 for certain species. Another study found SARS-CoV-2 to be a chemera between a corona bat virus and an unknown corona virus. Compared with other animals, the most likely repository for SRAS-CoV-2 wildlife were snakes. Some research has found that SARS-CoV-2, an isolated corona virus in China, is only closely associated with chrysanthemum bats. Research supports the theory that bath transmission has begun and that comparisons between SARS-CoV and SARS-CoV-2 for biological characteristics have been submitted in Table 1 [23–25].

*A primary reservoir of COVID-19*

The source and transmission should be determined in order to develop preventive strategies to contain the infection. Researchers for SARS-CoV focused first on raccoon dogs and palm civets as a major infection reservoir. The findings from viral RNA only show, however, that the civet hand palm could be secondary hosts in the isolated samples of calves on the food market. Samples of healthy people from Hong Kong were insulated in 2001 and molecular evaluations revealed 2.5% of the frequency of SARS-corona virus antibodies. These evidence show that SARS-corona can circulate in human beings before the outbreak of 2003. Later, Rhinolophus bats also contained anti-SARS-CoV antibodies that indicate bats as the cause of viral replication. Middle East Respiratory Syndrome (MERS) was the first corona virus in Saudi Arabia in 2012. MERS-corona also has camels as its primary host or zoonotic source as beta corona virus. A recent study has also found that MERS-corona virus is the key host of Pipistrellus and Perimyotis bats and their medium of transmission. Initially, a group of researchers suggested that snacks could be host to but that snacks were not supported, but bats alone could be the main reservoirs after new corona virus with SARS-like Bat viruses were found genomically similar. Homologous recombination analyzes also showed that the receptor-splitting

**Table 1**
Comparative analysis of biological features of SARS-CoV and SARS-CoV-2 [28–30].

| Sl. no. | Features | SARS-CoV | SARS-CoV-2 |
|---|---|---|---|
| 1 | Date of emergency | November 2002 | December 2019 |
| 2 | Emergency area | Guangdong, China | Wuhan, China |
| 3 | Fully controlled date | July 2003 | Not yet controlled |
| 4 | Key hosts | Bat, palm civets and Raccon dogs | Bat |
| 5 | Number of infected countries | 26 | 109 |
| 6 | Entry receptors in human | ACE2 receptor | ACE2 receptor |
| 7 | Symptoms and signs | Fever, malaise, myalgia, headache, diarrhoea, shivering, cough and shortness of breath | Cough, fever and shortness of breath |
| 8 | Disease caused | SARS, ARDS | SARS, COVID-19 |
| 9 | Infected patients in total | 8098 | 124,582 (as on 1st April 2020) |
| 10 | Recovered patients in total | 7322 | 68,751(as on 1st April, 2020) |
| 11 | Died patients in total | 776 | 4473 |

glycoprotein of the new corona virus is developed by SARS-CoV (CoVZXC21 and CoVZC45) and a still unidentified Beta-CoV. Further work needs to be carried out, however, to determine the intermediate zoonotic sources that have transmitted the virus to people to eradicate the virus [26,27].

*Analysis on spread of corona virus*

In 2003, a virus causing Severe Acute Respiratory Syndrome (SARS) was infected to the Chinese population of the province of Guangdong. A member of the subgroup beta corona virus and named SARS-CoV has been confirmed. Symptoms of pneumonia with spread alveolar wound leading to acute respiratory distress (ARDS) syndrome in the infected patients were reproduced. SARS first emerged in Guangdong, China, then quickly spread to more than 8500 infected and 786 deaths around the globe. Decade later, a few Saudi Arabians were diagnosed with a new corona virus in 2012. This virus has been confirmed as a corona virus and is referred to as the corona virus (MERS-CoV) of the Middle East Air Syndromes. More than 2628 people and 858 deaths have been reported by the World Health Organization (WHO). MERS-CoV belong to the beta-corona virus subgroup and is different from other human-CoV phylogenetically [31]. MERSCoV infection causes mild upper air injury, while it causes severe respiratory conditions. Patients suffering pneumonia, followed by ARDS and renal failure, similar to SARScorona virus. WHO recently received several reports of pneumonia with unfamiliar etiology by the Chinese government before the end of 2019. The outbreak began in Hunan in Wuhan, China, and has quickly infected more than 50 populations. Live animals, like bats, frogs, snakes, birds, marmots and rabbits, are frequently sold on the Hunan market. The Chinese National Health Committee published further information on the epidemic of viral pneumonia on 12 January, 2020. The virus has been identified as a new corona virus by the sequence-based analysis of the patient's isolates. In addition, for diagnosis of viral infection the genetic sequence was also provided. It was initially suggested that in the Chinese marine market where live animals were sold, or infected animals, birds or animals as food sources were used by patients with Wuhan-induced corona-virus pneumonia. Further investigations however revealed that some people even visited the seafood market without a record of the infection. These observations indicated that this virus is human for the spread of this virus in over 100 countries worldwide. People with the human spread of the virus are exposed to coughing, sneezing, respiratory droplets or aerosols due to close contact with an infected individual. These aerosols may be inhaled through the nose or mouth through the body (lungs) [27–31].

*Entry mechanism of corona virus*

All corona viruses contain specific genes which encode protein in downstream ORF1 regions for viral replication, nucleocapsid and spiking. The glycoprotein spikes on the external surface of corona viruses are responsible for attachment and entry of the virus into host cells. This means that the virus can infect multiple hosts via the RBD domain, which is loosely linked between viruses. SARS-CoV and MERS-CoV, mainly amino peptidases or carbohydrates, are the main vectors for the entry into human cells. The mechanism of the entry of the corona virus depends on the protease in the spike proteins dividing cells. HT, cathepsins and serine 2 (TMPRSS 2) transmembrane protease in the breathing system of humans. MERS-corona viruses are the main recipients of angiotensin converting enzyme 2 (ACE2). Dpeptidyl-peptidase (DPP4) is used by the MERS-corona virus. Typical SARS-Cov-2 corona spike protein virus is used as well as other proteins, such as RNA polymerase and 3-chymotrypsin proteases, papain proteases and helicase. SARS-Cov-2 the SARS-CoV-2 spike protein contains a 3D RBD structure that preserves van der waals strengths. A critical lysine 31 for the ACE2 human receptor is the 394 glutamine residue in the SARS-CoV-2 area. The entire pathogenic mechanism of SARS-CoV-2 is well described in the figure below (Fig. 7, attachment to reproduction) [30–32].

*Genomic variations in SARS-CoV-2*

More than 80% of the previous human corona virus has been found to be SARS-CoV-2 genome. Fig. 8 below shows the phylogenetic corona virus tree. The structural protein codes are comprised of the four structural genes, including spike (S), envelope (E), membrane (M) and nucleocapsid (N). Orf1ab is the biggest gene covering the pp1ab and 15 nsps of SARS-CoV-2. Gene encodes of pp1a protein orf1a are ten nsps. SARS-CoV-2 is similar to the evolutionary tree group of SARS-corona viruses. The lack of SARS-CoV and SARS -CoV-2 protein, and the fluctuation of SARS -CoV-2 amino acids in 8b and 3c, were shown in recent studies to be significantly changing. Wuhan corona virus spike glycoprotein also has reported changes through homologous recombination [33]. The SARS-CoV-2 spikes are the SARS-CoV bat blend and an unfamiliar Beta-CoV blend. A fluorescent study also found that ACE2 (angiotensin converting enzyme 2) was used for the same SARS- CoV-2 cell receptor and previously SARS-CoV mechanism for entry into the host cell. The single N501 T mutation in SARS-CoV-2 Spike Protein could significantly improve its ACE2 binding affinity.

## Clinical, epidemiological and pathological characteristics

Through COVID-19 in various countries, pneumonia was mainly characterized by fever and was accompanied by a variety of cough, dyspnea, fatigue and discomfort. However, COVID-19 did not demonstrate clinical symptoms. COVID-19 Effective and active patient isolation or close contact measures are readily overlooked in patients with mild symptoms. In addition, laboratory tests demonstrated COVID-19 platitudes with lymphopenia, leukopenia, and thrombocytopenia with a high concentration of liver enzymes

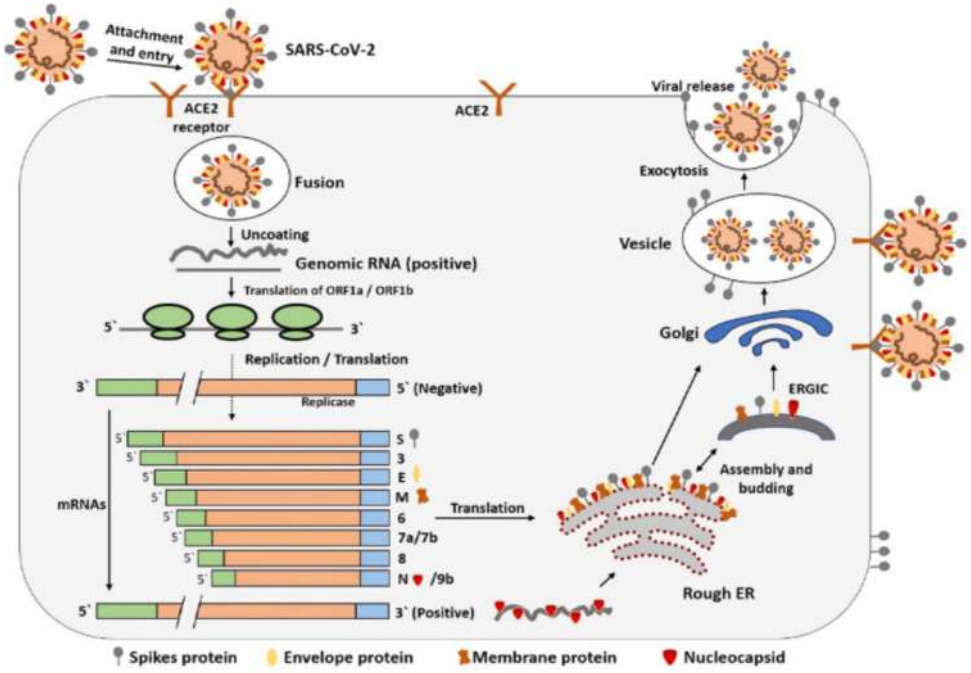


**Fig. 7.** Pathogenicity of SARS-CoV-2 – an entry mechanism.

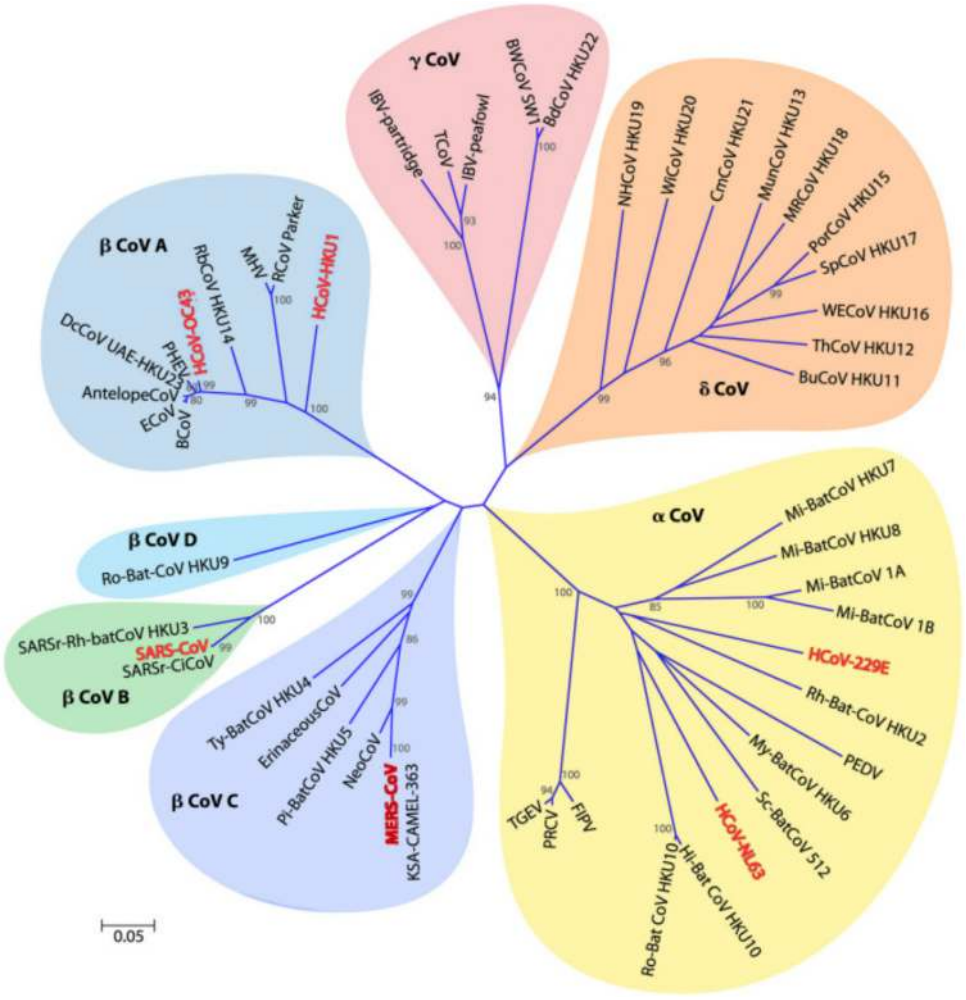


**Fig. 8.** Corona virus phylogenetic tree.

**Table 2**
Summary the characteristics of various studies that analysed the clinical or pathological characteristics of COVID-19 in different countries (till April 15, 2020) [39].

| Sl. no. | Year | Country | Age | Healthcare workers (in %) | Severe Patients (in %) | Died patients (in %) | Mode of transmission |
|---|---|---|---|---|---|---|---|
| 1 | 2020 | China | 35 | 0 | 12 | 0 | Human-to-human, close contact, familial cluster |
| 2 | 2020 | Korea | 35 | 0 | 11 | 0 | Human-to-human, close contact |
| 3 | 2020 | Australia | 25 | 0 | 0 | 0 | Human-to-human, close contact, familial cluster |
| 4 | 2020 | Germany | 65 | 0 | 0 | 0 | Human-to-human, close contact |
| 5 | 2020 | Thailand | 45–63 | 0 | 23 | 0 | Human-to-human, close contact |
| 6 | 2020 | Korea | 51–65 | 0 | 12 | 0 | Human-to-human, close contact, familial cluster |
| 7 | 2020 | China | 54 | 0 | 13.5 | 0 | Human-to-human, close contact |
| 8 | 2020 | United States | 62 | 0 | 23.7 | 21.1 | Human-to-human, close contact |
| 9 | 2020 | Canada | 34–47 | 2 | 3 | 3.9 | Human-to-human, hospital-related |
| 10 | 2020 | China | 29–39 | 3 | 5 | 4.8 | Human-to-human, familial cluster |
| 11 | 2020 | China | 54 | 4 | 7 | 6.9 | Human-to-human, close contact |
| 12 | 2020 | China | 36 | 1 | 8 | 5.9 | Human-to-human, close contact |
| 13 | 2020 | China | 38 | 0 | 9 | 6.8 | Human-to-human, close contact |
| 14 | 2020 | China | 44–55 | 5 | 0 | 23.9 | Human-to-human, close contact, familial cluster |
| 15 | 2020 | China | 46 | 1 | 0 | 21 | Human-to-human, close contact |
| 16 | 2020 | Thailand | 48 | 0 | 0 | 32.6 | Human-to-human, close contact |
| 17 | 2020 | China | 35–45 | 0 | 0 | 45 | Human-to-human, close contact, familial cluster |
| 18 | 2020 | China | 34 | 0 | 0 | 56 | Human-to-human, close contact |
| 19 | 2020 | China | 32–67 | 1 | 232 | 67.6 | Human-to-human, close contact |
| 20 | 2020 | China | 67 | 3 | 41 | 21 | Human-to-human, close contact, familial c4luster |
| 21 | 2020 | China | 62 | 0 | 2 | 22 | Human-to-human, close contact |
| 22 | 2020 | China | 35–44 | 0 | 3 | 23 | Human-to-human, close contact, familial cluster |
| 23 | 2020 | China | 42 | 0 | 34.8 | 43 | Human-to-human, close contact, familial cluster |
| 24 | 2020 | China | 32–54 | 0 | 35.5 | 32.5 | Human-to-human, close contact, familial |
| 25 | 2020 | China | 34 | 02 | 0 | 34.8 | Human-to-human, close contact, familial cluster |
| 26 | 2020 | Korea | 32 | 3 | 8 | 22 | Human-to-human, close contact, |
| 27 | 2020 | China | 56 | 4 | 7 | 33 | Human-to-human, close contact, |
| 28 | 2020 | China | 67 | 6 | 23.7 | 45.8 | Human-to-human, close contact, |
| 29 | 2020 | China | 68 | 0 | 22 | 43.7 | Human-to-human, close contact, |
| 30 | 2020 | China | 62 | 0 | 1.3 | 56 | Human-to-human, close contact, familial |

and lactate dehydrogenase. The picture shows COVID-19 mainly as various floor-glass shadows. In the typical CVID-19 scan, a single or more patchy frosted glass shadow with septum thickening was found in 29 COVID-19 patients [33]. As the disease progresses, the lesion increases and increases its scope, while the shadows of frozen or striated crystals co-exist. An picture study by 81 people showed that abnormal chest imaging was possible even in asymptomatic patients and rapidly advanced from one point of focus to two in 1–3 weeks. Given the lack of visibility of early changes to COVID-19, high-solving chest CT tests should be performed as quickly as possible to clarify suspected patients. COVID-19 is not currently treated with particular medicines and is primarily aimed at support therapy [34,35]. Infectious diseases such as early detection, earlier isolation, early diagnosis and earlier treatment are therefore important measures for control. With our COVID-19 clinical and pathological evaluation, health care workers can develop an early therapeutic strategy to reduce mortality in similar patients. Table 2 below shows the characteristics of several studies in various countries that analyzed clinical or pathological properties of COVID-19 [33–37].

*Pathological characteristics*

The SARS-CoV-2, SARS-CoV (SARSr-CoV) was detected as a sister virus. The virus is a virus of the sister. The interactions of the enzyme receptors S virus and angiotensin 2 have shown that human cells infect the epithelial breathing cells. Therefore it may be speculated that pathological changes are the same. In addition to respiratory transmission SARS may also be transmitted in the digestive tract through contact with feces, urine and skin, early SARS diseases showed a widespread SARS epithelium in the digestive system and on the renal epithelium and the sulphur glands in the skin. This also provided a new way of preventing COVID-19 transmission. Dings & others have also found that endocrine SARS-CoV is systemic. SARS-CoV and SARS-CoV-2 can be based on the same system of action and produce multiple body cytokines quickly, causing acute breathing distress and failure of the organ following the inflammation of a micro-organism. This also explains why most Covid19 patients develop mild symptoms, and some suddenly get worse after too numerous cytokines are diagnosed in hospitals that are related to the body, which lead to a c̈ytokine stormin̈ the body [38]. In patients with COVID-19 who were similar to pathological SARS events, early pneumococoic oedema were found to be diffuse alveolar damage, transparent membrane formation, and pulmonary edema. Tian and others and Xu et al. however, fibromyxoid exudations and the development of thick mouth plugs are also present in the COVID 19 pathology. Also known is the disease. During the first automation by the Lipteam, numerous adhesive secretions were found in the alveoli. Three of 11 cases were completed by the Liu personnel, with preliminary anatomical diagnosis in all mucus secretions in the dead lungs on February 25. This discovery is a therapeutic warning. Oxygen cannot achieve the objective alone when the mucus is not dissolved and can sometimes counterproductively increase the patient's hyposensitivity [38].

*Epidemiological characteristics of COVID-19*

In a study by Wang et al., 10–24 January, 2020, the number of people diagnosed with SARS-CoV-2 infections in China rose 31.4 times. The number of people diagnosed with COVID-19 was used in China on 23 February, 2020, 1879 times that on 10 February, 2020. They estimated the rate of death of COVID-19 to 2,84%, based on their patient package. The authors found also that male to female ratio was 3,25:1, that the average age of death was 75, that the average time of death was 14 days, and that the median time between early and death was shortage (11,5 days) in those under 70 years of age. These findings show that elderly people can develop the disease more quickly than young people. A Li et al. study found that 425 SARS-CoV-2 patients were medium aged 59 years, with males at 56%, averaged 5.2 days and nearly half of adults at age 60 or older.

The incubation time was 5.2 days in average. In the early stages, the number of infected patients doubled every 7.4 days. The transmission rate was 2.2 for individual infected patients. Although at 55% of Huanan seafood patients infected with SARS-CoV-2 have grown exponentially since the end of December 2019. Huang et al. have demonstrated underlying diseases, 41 SARS-CoV-2 patients, 73% of male, 32% of patients (eight) diabetes, hypertension (six patients) and cardiovascular diseases (six) It was 49 years old on average. 27 were linked to the Huanan Seafood Market out of 41 patients. In this study, fatality rates were 15% among SARS-CoV-2 patients. Transmission rates were estimated by Wu et al. at 0.3 for individual infected patients. A trial. The death rate for SARS-CoV-2 infected patients was 14% in this study [37–39].

## COVID-19 based on current evidence

### *Mechanism and symptoms*

Zhao et al. found that the SARS-CoV-2 receptor was an angiotensin converting enzyme 2 (ACE2). Types I and II alveolar epithelial cells express ACE2 in the normal human lung. Of these, 83% have an ACE2 expression of alveolar type II cells. In their alveolar cells, men had a higher ACE2 level than women. Asians have higher levels of ACE2 than white and African American populations in their alveolar cells. The SARS-CoV-2 binding on the ACE2 leads to an increased ACE2 expression and can lead to alveolar cell damage. Damage to alveolar cells, in turn, can result in a number and even death of the systemic reactions. They also confirmed Asian men are more likely to become infected with SARS-CoV-2. Wrapp et al. have found that SARS-CoV-2's receptor binding capacity is 10–20 times higher than SARS-CoV. Huang et al., found that 98% of the study patients had a fever, 78% of which were over 38 °C. They indicated that 76% of patients suffered from coughs, 44% had fatigue and muscle pain, and 55% were dyspneous. There have also been small numbers of people with sputum (28%), headaches (8%), hemoptysis (5%), and diarrhoea (3%). Laboratory tests revealed that 25% had leukopenia and 63% had lymphocytopenia in infected patients. 37% of patients experienced higher levels of aspiration aminotransferase. The diagnosis of Myocarditis in 12% of patients has increased significantly in those patients with hypersensitive troponin I. In 100% of patients abnormalities were discovered in chest-computed tomography (CT) images. 98% of the bilateral lungs of infected patients have found grinding glass like and consolidation areas. Three cases of COVID-19 have been reported by Zhu et al. Patient 1 was a 49-year-old woman with fibre and coughs accompanied with chest discomfort (body temperature 37–38 °C). Their tears and chest discomfort worsened, but their fever subsided, four days after the disease started. In the first stage of the disease, Patient 2, a 61-year-old male developed fever and cough also. Air distress occurred 7 days after symptoms started, and it deteriorated in the following 2 days. Mechanical ventilation was applied to him. Patient 3 was a male aged 32 who did not have symptoms in the article. After therapy, patients 1 and 3 recovered and were released from the hospital, but patient 2 died after 20 days of therapy. Guan et al., 1099 cases of n-CoV infection in 2019 have been reported. It was found that the most common symptoms were fevers (87.9%) and cough (67.7%). Rare were diarrheas (3.7%) and vomiting (5.0%). In 96% of the SARS-CoV 2 infected patients, abnormalities in chest ct pictures were found; in 82.1%, lymphopenia was observed [40].

### *Diagnosis, prevention and treatment of COVID-19*

No vaccines were developed successfully with COVID-19 as of 23 February, 2020. Current treatment for SARS-CoV-2 infections is primarily symptomatic. The study by Huang and others showed that acute respiratory distress, anaemia, acute heart injury and secondary infections were the most common complications of patients infected with 2019-nCoV. The most commonly treated are empirical antibiotics, antibiotics, antiviral (oseltamivir), and systemic corticosteroids. Invasive mechanical ventilation was provided to patients with intractable hypoxemia. In the treatment of patients with SARS-CoV-2 Holshue et al. used remdesivir and achieved good results. Lu postulated that inhibitors of COVID-19, RNA synthetic inhibitors and traditional Chinese medicine can also be used in antiviral and antibiotics. The efficacy of these products must still be monitored in clinical trials. In the absence of effective treatments, the best way to deal with the SARS-CoV-2 epidemic is to monitor sources of infection. Strategies include early diagnosis, reporting, isolation and treatment of disease; prompt disclosure of epidemic information; and social order maintenance. The SARS-CoV-2 infection can be prevented effectively by individuals with protected measures, including improvements in personal hygiene, use of medical masks, adequate rest and a well ventilated room. The following Table 3 shows different characteristics and details of the patients affected [35–40].

**Table 3**
Different characteristics and affected patients details [38].

| Characteristics | Variables | Number of patients (as of April 15, 2020) |
|---|---|---|
| Clinical characteristics | Fever | 2,340,678 |
| | Cough | 678 |
| | Malaise/fatigue/confusion | 345 |
| | Sputum production | 456 |
| | Shortness of breath | 1383 |
| | Myalgia | 34 |
| | Sore throat | 456 |
| | Headache | 234 |
| | Rigor/chill | 23 |
| | Diarrhea | 238 |
| | Stomach ache | 345 |
| | Nausea/vomiting | 367 |
| | Chest pain | 45 |
| | Hemoptysis | 13 |
| | Nasal congestion | 24 |
| | Runny | 45 |
| Coexisting disorders | Hypertension | 2789 |
| | Diabetes | 3456 |
| | Cardiovascular disease | 4567 |
| | Respiratory disease | 3457 |
| | Digestive disease | 345 |
| | Kidney disease | 289 |
| | Immunodeficiency | 213 |
| Laboratory findings | Lymphopenia ($10^9$/L) | 1324 |
| | Leukopenia ($10^9$/L) | 234 |
| | Thrombocytopenia ($10^9$/L) | 456 |
| | Elevated lactate dehydrogenase (U/L) | 78 |
| Radiologic findings | Unilateral pneumonia | 345 |
| | Bilateral pneumonia | 456 |
| | Ground-glass opacity | 3456 |
| | Pulmonary consolidation | 879 |

## Country-by-country data on the pandemic

The actual number of confirmed mortality in COVID-19 is likely to be higher, due to small testing, and death attribution problems, the difference between confirmed deaths and total deaths is country-by-country/how COVID-19 deaths occur in the recording may differ from country to country (e.g., some country may count hospital deaths only and some other countries may count hospital deaths). Figs. 9–11 depicts about the predicted cases of COVID-19 in India, cumulative number of confirmed cases and daily confirmed cases till May 2, 2020. Charts that simply indicate the change in confirmed deaths over time are not very useful to answer how

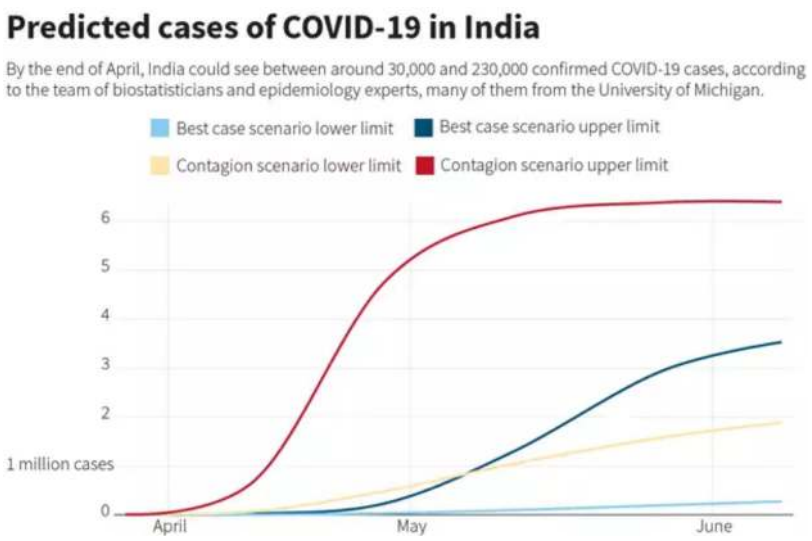


**Fig. 9.** Predicted cases of COVID-19 in India.

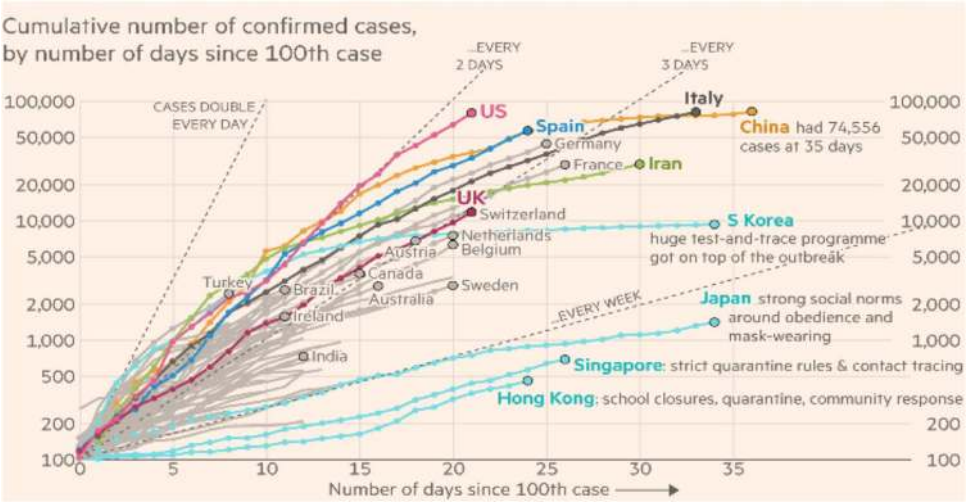


**Fig. 10.** Cumulative number of cases confirmed by 100th case – days.

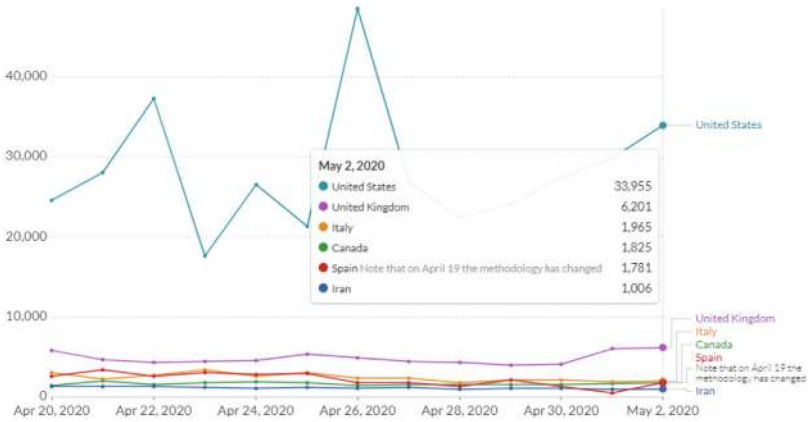


**Fig. 11.** Daily confirmed cases till may 2, 2020.

fast the outbreak is compared between countries. The COVID-19 outbreak did not start in all countries simultaneously. Most Western countries have the same corona virus trajectory, with limited propagation by Hong Kong and Singapore and slowed by Japan and Korea. The following figure shows the graphics of this [40–43].

This diagram is designed for comparisons of this type. Every country starts on the day that 5 confirmed deaths were reported for each country. This allows you to compare the rapid increase in the number of confirmed deaths in each country following the outbreak. The gray lines behind you help you to see that there is a

rapid increase in the number of confirmed deaths [43]. These lines show the paths for 1, 2, 3, 5 and 10 days doubling times. The double times of confirmed cases in that country are faster when the pitch is steeper than the gray line. Some countries, for example, have a steeper gradient than the ëvery two days¨– their count of death doubled more quickly than every two days. There are two different countries.

## Conclusion

The new corona virus originating in the Hunan market for seafood in Wuhan (China) is spread rapidly to 109 countries and sells bats, snakes, raccoons, palms and other animals. Sequent analysis suggests, however, that the bats are the most important reservoir, but SarS-CoV-2 zoonotic source is not validated. The RBD spike-glycoprotein recombination was identified to be the RBD for the transmission of cross-species and rapid infections of a separate beta-CoV with SARS-CoV (CoVZXC21 or CoVZC45). According to phylogenetic trees, the SARS-CoV is close to SARS-like bat CoV. So far no promising treatments or prevention strategies have been developed for human corona viruses. Researchers are however developing effective therapeutic strategies for the treatment of new corona viruses. Various broad spectrum antiviral, alone and in combinations, have been evaluated for the treatment of the COVID-19 mice models and pre-influenza, SARS and MERS corona viruses. Especially in order to avoid the current and future epidemics of targeting vaccines and antiviral, human corona viruses should be developed. Many companies, including Modern Therapy, Inovio Pharmaceuticals, Novavax, Biovir, Stermirna Therapeutic, Johnson & Johnson, VID O-InterVac, GeoVax-BravoVax, Clover, CureVac and Codagenix have been supporting the development of effective SARS COV 2 vaccinations. However, fast trails are necessary for both humans and animals because these vaccines must be marketed 3–10 months. It must be completely forbidden to use wild animals and birds as a food source.

## Prospective

A strategy for fast diagnosing SARS-CoV-2 in suspected patients is also necessary in addition to the development of the most effective drug. COVID-19 is somewhat similar to influenza and shows signs and signs of seasonal allergies (pollen allergies) caused by SARS-CoV-2. Individuals who have influenza or seasonal allergies may also be suspected of the temperature of the thermo sensor. A precise and rapid diagnostic kit or meter is therefore essential in the detection of SARS-CoV-2 that is expensive and time consuming in suspected patients. In order to effectively monitor outbreaks, as well as limited mortality, different medical groups in China should immediately send COVID-19 to countries in Europe and elsewhere, particularly Spain and Italy at a rate below three percent. In other countries too, the therapeutic strategies used in China should be followed. It is not fully understood what is the SARS-CoV-2 source, media host, transmission and incubation time. The virus is still unpredictable and unpredictable. The early pathology test is therefore the most straightforward way to recognize the true SARS CoV-2 face. The COVID-19 outbreak was an epidemic threat both worldwide and in China. Early recognition of COVID-19 is important for institutions of public health, health workers and the general public, in order to avoid additional cases or poor health effects by coordinated and effective measures.

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