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# COVID-19: A Deadly Virus

**Seema Singh**
Ph. D, Department of food and Nutrition, Swami Keshwanand Rajasthan Agricultural University, Bikaner, Rajasthan, India

**Abstract**
The new coronavirus (SARS-CoV-2) pneumonia that occurred in Wuhan, China in December 2019 is a highly contagious disease. The World Health Organization (WHO) has declared the current outbreak of a global public health emergency. It was originally called the 2019 Novel Coronavirus (2019-nCoV) and was recently reclassified as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The disease it causes is called Coronavirus Disease 2019 (COVID-19). First observed in Wuhan, China, it is now rapidly spreading throughout the world. As of April 15, 2020, 2,034,913 confirmed cases have been confirmed worldwide, with 129,913 deaths. The World Health Organization (WHO) called COVID-19 a pandemic on March 11, 2020. However, vaccines are not available, so the best way to fight the virus is prophylactic.

**Keywords:** Coronavirus, severe acute respiratory, vaccine, pneumonia

## Introduction
In December 2019, adults in Wuhan, the capital of Hubei Province and China's main transportation hub, began to visit a local hospital suffering from severe pneumonia of unknown cause. Many of the first cases were commonly exposed to the South China Wholesale Seafood Market, which also trades live animals. A surveillance system (introduced after the SARS outbreak) was activated and patient respiratory samples were sent to a reference lab for etiology. On December 31, 2019, China notified the World Health Organization of the outbreak and on January 1, the South China Seafood Market was closed. On January 7, the virus was identified as a coronavirus with > 95% homology to the bat coronavirus and > 70% similarity to SARS-CoV. Environmental samples from the Huanan seafood market have also been positive, indicating that the virus originated there [1]. The number of cases began to grow exponentially, some of which were not exposed to the live animal market, suggesting the fact that person-to-person transmission was occurring [2]. The first fatal case was reported on January 11, 2020. The massive migration of Chinese during Chinese New Year fueled an epidemic. Incidents in other parts of China and other countries (Thailand, Japan, South Korea) were reported by people returning from Wuhan. On January 20, 2020, the infection was reported to a health care worker who cares for the patient. Soon the blockade was expanded to other cities in Hubei. Cases of COVID-19 in countries other than China have been reported in countries without a history of travel to China, suggesting that local to person transmission has occurred in these countries [3].

Humankind has observed various pandemics throughout history. We see the battle against the invisible enemy, the novel COVID-19 coronavirus, again at a very tough time. First observed in Wuhan, China, it is now rapidly spreading throughout the world.

As of today, 27 April 2020, there are 3,029,709 Coronavirus cases, with 209,242 deaths while 900,319 have been recovered. In the total Coronavirus, patients died, the highest number belongs to the USA i.e. 56,139 deaths. The death toll is followed by Italy (26,977), Spain (23,521) and France (22,856).

## Symptoms
Common 2019-nCoV symptoms include acute respiratory disease syndromes such as shortness of breath, fever, cough, weakness and diarrhoea. For some, it is more severe and can lead to pneumonia or dyspnea. More rarely, the disease can be fatal. Older people and people with pre-existing medical conditions (such as diabetes and heart disease) were more vulnerable to the virus and became seriously ill [4].

## Human Coronavirus Types
Coronaviruses are classified into four types, including alpha, beta, gamma, and delta coronavirus. The first human coronavirus was identified in 1960 and to date, seven human coronaviruses have been identified.

1. 229E (alpha coronavirus)
2. NL63 (alpha coronavirus)
3. OC43 (Beta coronavirus)
4. HKU1 (Beta coronavirus)
5. MERS-CoV (Beta coronavirus that causes Middle East respiratory syndrome or MERS)
6. SARS-CoV (beta coronavirus that causes Middle East respiratory syndrome or SARS)
7. 2019 Novel Coronavirus (2019-nCoV)

Human coronaviruses 229E, NL63, OC43 and HKU1 have commonly infected people around the world. Human coronavirus 229E (HCoV-229E) is one of the first reported coronavirus variants. It is associated with the common

symptoms of colds in healthy adults [5]. Younger children and the elderly are considered vulnerable to lower respiratory tract infections (LRTI). Such viruses account for 4-15 % of adult acute respiratory illness each year, and up to 35 % at peak times. The average infection rate in children reaches 8 %, with a peak infection rate of up to 20 % [6].

The new human coronavirus (HCoV-NL63) was isolated in 2004 from a 7-month-old infant with respiratory symptoms in the Netherlands. Since then, the virus has been found in various countries, suggesting its spread worldwide. HCoV-NL63 is a predominantly infected child, with moderate upper respiratory symptoms such as cough, fever, rhinorrhea or severely immunocompromised children with severe LRTI such as bronchiolitis and croup in younger children. You can see it [7]. It is estimated that 1-10% of the population are affected each year by cold-like symptoms of HCoV-NL63 [8].

Human coronavirus OC43 (HCoV-OC43) was thought to account for 5-30% of human respiratory infections [9]. Both HCoV229E and HCoV-OC43 cause LRTI and otitis media. No evidence was observed that coronavirus-like particles in virus-infected patient stools could cause enteric disease in humans, even though they contained particles like coronavirus [10].

The first Group A human β-CoVHKU1 virus was discovered in Hong Kong in 2004 and later in humans worldwide. Like other human coronaviruses, this new coronavirus HCoV-HKU1 causes 0.9% LRTI and URTI [11]. HCoV-HKU1-related respiratory tract infections are identical to other respiratory viruses. Most URTI patients complained of fever, runny nose and cough. Patients with LRTI have symptoms such as fever, cough, and dyspnea.

Exposure to HKU1 is usually estimated for children under 6 years of age [12]. In general, HKU1 infections cause mild URTIs and may also cause severe respiratory infections, including pneumonia in children, the elderly, and immunocompromised patients [13].

Coronaviruses usually infect animals, and sometimes it develops as a new human coronavirus that can make people sick. 2019-nCoV, SARSCoV, and MERS-CoV are three recent examples.

## Transmission

### Symptomatic transmission

By definition, a symptomatic COVID-19 case is one that develops signs and symptoms that are compatible with a COVID-19 viral infection. A symptomatic transmission is an infection from a person while experiencing the symptoms. Published epidemiological and virological research data show that COVID-19 is primarily from symptomatic persons, via respiratory droplets, by direct contact with infected persons, or on contaminated objects or surfaces. Providing evidence of contact with other people through contact with them [14, 20]. This is supported by in-depth experiences shared by technical partners through the WHO Global Expert Network and reports and presentations by the Department of Health. Data from clinical and virological studies with repeated collections of biological samples from confirmed patients provide evidence that COVID-19 virus excretion is highest in the upper respiratory tract (nose and throat) early in the course of the disease. I will [21, 24]. That is, within the first 3 days of the onset of symptoms.

### Pre-symptomatic transmission

The latency of COVID-19, which is the time between virus exposure (infection) and the onset of symptoms, averages 5-6 days but can be up to 14 days. During this period, also known as the "pre-onset" period, some infected individuals can become contagious. Therefore, infections from pre-symptomatic cases can occur before the onset of symptoms. A small number of case reports and studies document pre-symptomatic transmission through contact tracing efforts and an enhanced survey of clusters of confirmed cases [25, 30]. This is supported by data suggesting that some people may test positive for COVID-19 as early as 1-3 days before symptoms develop [19, 29]. Therefore, people infected with COVID-19 are pre-viral with significant symptoms. In pre-symptomatic infections, it is important to recognize that the virus must spread through infectious droplets or by touching contaminated surfaces.

### Asymptomatic transmission

Cases confirmed by asymptomatic tests are people who are infected with COVID-19 and have no symptoms. Asymptomatic infection refers to the transmission of the virus from people who do not develop symptoms. There are few reports of confirmed cases in the laboratory that are truly asymptomatic and to date, there is no record of asymptomatic infections. This does not exclude the possibility that it will occur. In some countries, asymptomatic cases have been reported as part of contact follow-up.

## Prevention

Prevention is important because there is currently no approved cure for this infection. Several properties of this virus make it difficult to prevent. That is non-specific features of the disease, infectivity before the onset of latencies, infections from asymptomatic people, long latencies, the tropism of mucosal surfaces such as the conjunctiva, prolonged duration after clinical recovery. Even it causes illness and transmission [31].

Preventive measures to reduce the likelihood of infection include staying at home, avoiding congested areas, frequently washing your hands with soap and water for at least 20 seconds, practising good respiratory hygiene, and washing. Do not touch your eyes, nose, or mouth with your hands [32]. The CDC recommends covering the mouth and nose with a tissue when coughing or sneezing and using the inside of the elbow when no tissue is available [32]. They also recommend proper hand hygiene after coughing and sneezing [32]. The social separation strategy aims to reduce contact between infected people and large groups by closing schools and workplaces, limiting travel and cancelling large public gatherings. Distance guidelines also include that people are at least 1.8 meters (6 feet) apart.

Since vaccines are not expected as early as 2021 [35]. An important part of COVID-19's control is to reduce the peak of the epidemic known as "curve flattening" [36]. This is done by lowering the infection rate, reducing the risk of overwhelming health care services, allowing better treatment of the current case, and delaying the addition of new cases until an effective

treatment or vaccine is available [37, 38].

Those diagnosed with COVID-19 or who believe they may be infected are advised by the CDC to stay home except to get medical care, call ahead before visiting a healthcare provider, wear a face mask before entering the healthcare provider's office and when in any room or vehicle with another person, cover coughs and sneezes with a tissue, regularly wash hands with soap and water and avoid sharing personal household items [39, 40]. The CDC also recommends that individuals wash hands often with soap and water for at least 20 seconds, especially after going to the toilet or when hands are visibly dirty, before eating and after blowing one's nose, coughing or sneezing. It further recommends using an alcohol-based hand sanitiser with at least 60% alcohol, but only when soap and water are not readily available [41].

**Clinical characteristics of SARS-CoV-2 infection**

COVID-19 causes acute viral infections in humans, with a median latency of 3.0 days [42], similar to SRAS with a latency of 2-10 days [43]. The characteristics of COVID-19 infection in adults are significant. The most common clinical manifestations of SARS-CoV-2 infection were fever (87.9%), cough (67.7%) and fatigue (38.1%), but diarrhoea (3.7%) and vomiting (5.0%) were rare [44, 45] and was similar to other coronaviruses. Most patients showed some dyspnea at presentation because the time from onset of symptoms to the onset of acute respiratory distress syndrome (ARDS) was only 9 days in the first patient with COVID-19 infection [46]. Also, severely ill patients are prone to various complications, including acute respiratory distress syndrome, acute heart injury and secondary infections [47]. There is already some evidence that COVID-19 can damage tissues and organs other than the lungs. A study of 214 COVID-19 patients found neurological symptoms in 78 (36.4%) patients [48]. Besides, patients with COVID-19 already had evidence of ocular surface infection, and SARS-CoV-2 RNA was detected in their eye secretions [49]. Some COVID-19 patients have arrhythmias, acute heart injury, renal dysfunction, and liver dysfunction (50.7%) on admission [50, 51, 52]. A case report of pathological manifestations in a patient with pneumonia showed moderate microvascular steatosis in his liver tissue [50]. Also, tissue samples from the stomach, duodenum and rectal mucosa were confirmed to be positive for SARS-CoV-2 RNA

**Diagnosis of SARS-CoV-2**

Detection of viral nucleic acids is the standard for non-invasive diagnosis of COVID-19. However, current detection of SARS-CoV-2 nucleic acids has high specificity and low sensitivity, which can lead to false negatives and can lead to relatively long test times. The new coronavirus pneumonia diagnosis and treatment plan (fifth trial version) has adopted "the suspected case of pneumonia imaging function" as a clinical diagnostic criterion in Hubei Province [51]. However, the sixth edition of the diagnostic criteria no longer distinguishes Hubei from other states outside of Hubei [52]. One reason may be to distinguish between influenza and COVID-19. Also, MIT's Zhang F has developed a test paper for rapid detection of SARS-CoV-2 in 1 hour with SHERLOCK technology. Although not yet clinically validated, this technique, once proven, may help in the rapid diagnosis of disease [53]. Peking University research group claimed to have developed a new method for rapid construction of SHERRY's transcriptome sequencing library to aid in rapid sequencing of SARS-CoV-2 [54]

**Conclusion**

SARS-CoV-2 is spreading all over the world with amazing speed. Elderly and immunocompromised patients are the most vulnerable to the deadly effects of the virus. Although some treatment protocols have some promises, no cure for the virus has been identified and no vaccine has been developed at this time. With proper precautions, you can contain the virus and protect the population.

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