

SECTION I – INTRODUCTION AND BACKGROUND OF COVID19

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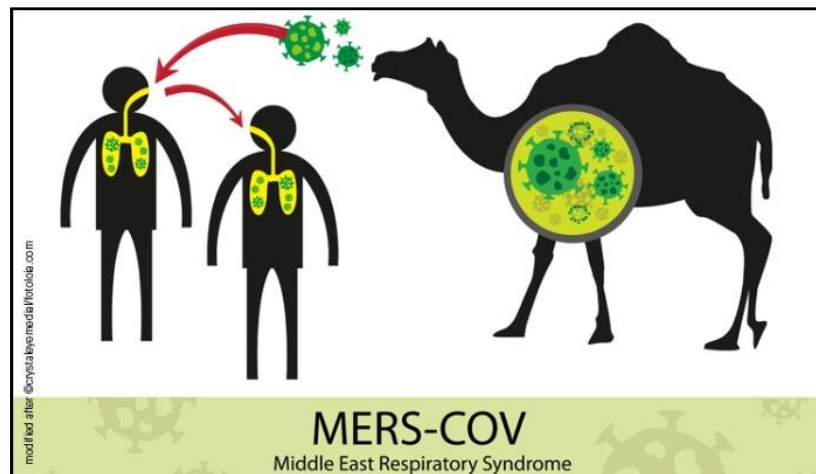
I. BACKGROUND

In late December 2019, a case of unidentified pneumonia was reported in Wuhan, Hubei Province, People's Republic of China (PRC). Its clinical characteristics were very similar to those of viral pneumonia. After analysis of respiratory samples, the experts at the PRC Centers for Disease Control declared that the pneumonia, later known as novel coronavirus pneumonia (NCP), was caused by a novel coronavirus. [1]

Epidemic of 2019, novel coronavirus, also called COVID19 or severe acute respiratory syndrome virus 2 (SARS- CoV- 2), was previously called 2019-nCoV.

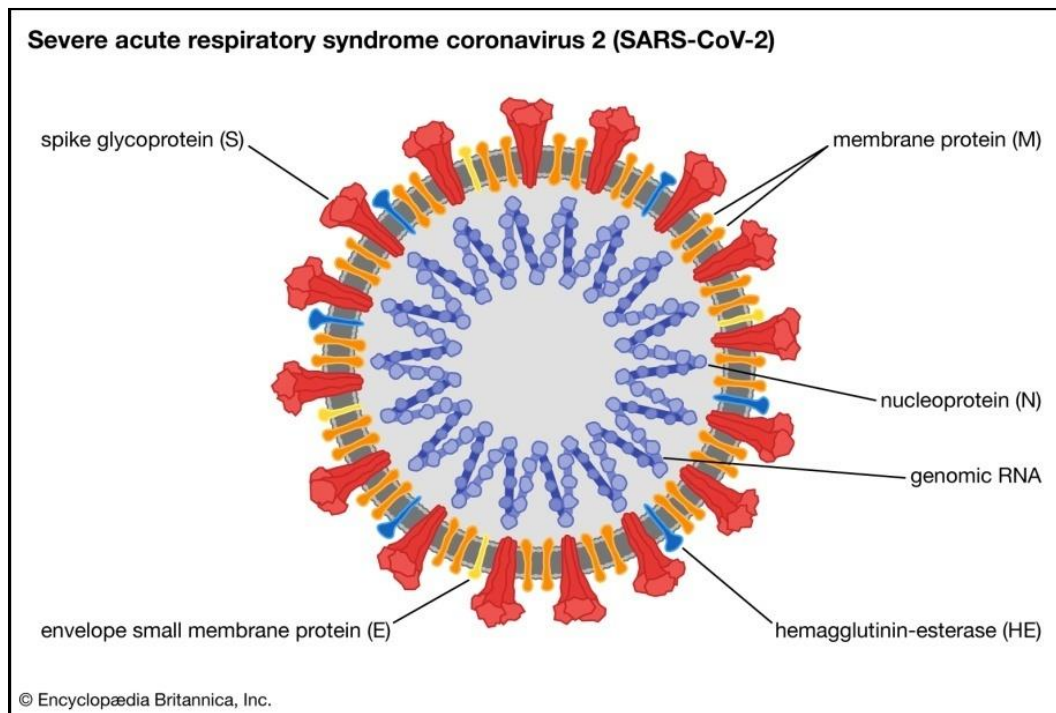
II. IS CORONAVIRUS SAME AS NOVEL CORONAVIRUS/COVID19 ???

Coronaviruses (CoVs) are important pathogens for human and vertebrates. They are a large family of zoonotic viruses that cause illness ranging from common cold to severe respiratory distress. They can infect respiratory, gastrointestinal, hepatic and central nervous system of human, livestock, avian, bat, mouse and many other wild animals. Since the outbreaks of the severe acute respiratory syndrome (SARS) in 2002 and the Middle East respiratory syndrome (MERS) in 2012, the possibility of CoVs transmission from animals to human has been proved. Since the end of 2019, an outbreak of mystery pneumonia in Wuhan has been drawing tremendous attention around the world. [2]



III. STRUCTURE OF NOVEL CORONAVIRUS/SARS COV-2

Coronavirus, any virus belonging to the family Coronaviridae. Coronaviruses have enveloped virions (virus particles) that measure approximately 120 nm (1 nm = 10⁻⁹ metre) in diameter. Club-shaped glycoprotein spikes in the envelope give the viruses a crownlike, or coronal, appearance. The nucleocapsid, made up of a protein shell known as a capsid and containing the viral nucleic acids, is helical or tubular. The coronavirus genome consists of a single strand of positive-sense RNA (ribonucleic acid) ranging from 60 nm to 140 nm in diameter. The with spike like projections on its surface giving it a crown like appearance under the electron microscope; hence the name coronavirus.[3]



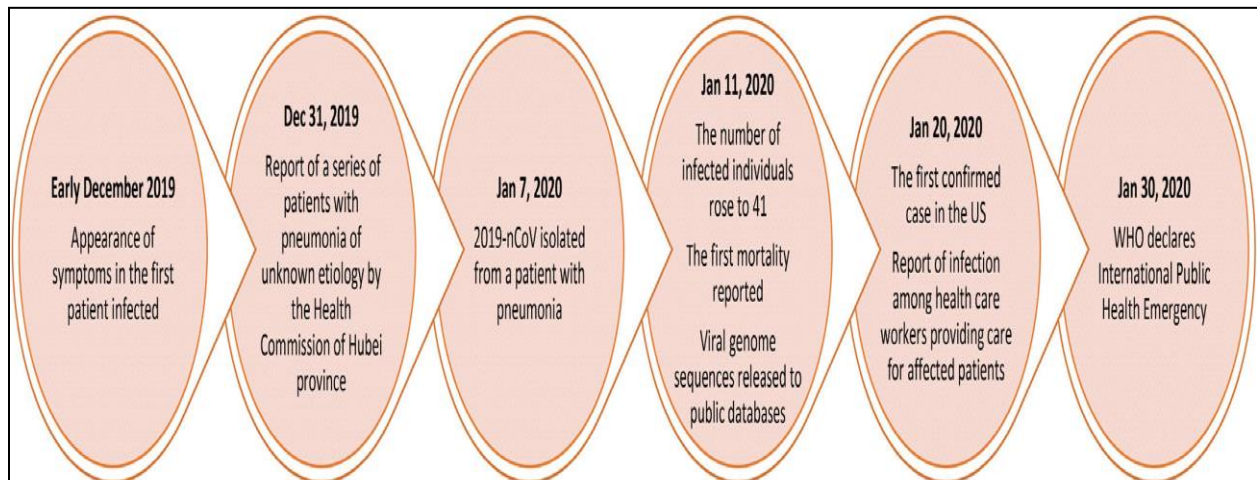
Source: <https://www.britannica.com/science/coronavirus-virus-group>

IV. ORIGIN AND TIMELINE

Origin

In December 2019, adults in Wuhan, capital city of Hubei province presented to local hospitals with severe pneumonia of unknown cause. Many of the initial cases had a common exposure to the Huanan wholesale seafood wet market. On December 31st 2019, China notified the outbreak to the World Health Organization and on 1st January the Huanan sea food market was closed. On 7th January the virus was identified as a coronavirus that had >95% homology with the bat coronavirus and > 70% similarity with the SARSCoV. The first fatal case was reported on 11th Jan 2020. Though the SARS-CoV-2 originated from bats, the intermediary animal through which it crossed over to humans is uncertain. Pangolins and snakes are the current suspects. [4]

Timeline

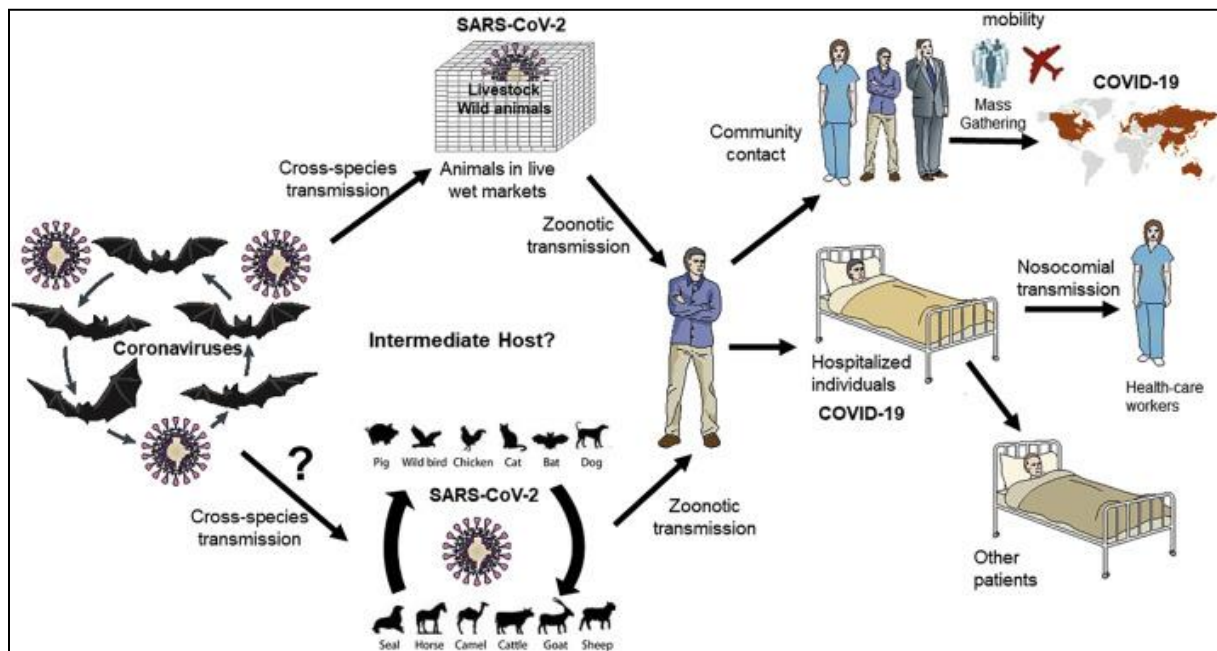


V. TRANSMISSION OF SARS- COV-2

Infection is transmitted through large droplets generated during coughing and sneezing by symptomatic patients but can also occur from asymptomatic people. Studies have shown higher viral loads in the nasal cavity as compared to the throat with no difference in viral burden between symptomatic and asymptomatic people [5]. These infected droplets can spread 1–2 m and deposit on surfaces. The virus can remain viable on surfaces for days in favourable atmospheric conditions but are destroyed in less than a minute by common disinfectants like

sodium hypochlorite, hydrogen peroxide etc. Infection is acquired either by inhalation of these droplets or touching surfaces contaminated by them and then touching the nose, mouth and eyes.

The virus is also present in the stool and contamination of the water supply and subsequent transmission via aerosolization/ feco oral route is also hypothesized. As per current information, transplacental transmission from pregnant women to their fetus has not been described. However, neonatal disease due to post natal transmission is described [6]. The incubation period varies from 2 to 14 d [median 5 d]. The basic case reproduction rate (BCR) is estimated to range from 2 to 6.47 in various modeling studies [7].



Risk of Transmission In Dentistry

Due to the unique characteristics of dental procedures where a large number of droplets and aerosols could be generated, the standard protective measures in daily clinical work are not effective enough to prevent the spread of COVID-19, especially when patients are in the incubation period, are unaware they are infected, or choose to conceal their infection. [8]

CASE DEFINITIONS

WHO periodically updates the Global Surveillance for human infection with coronavirus disease (COVID-19) document which includes case definitions. [9]

- **Suspect case**

A. A patient with acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath), AND a history of travel to or residence in a location reporting community transmission of COVID-19 disease during the 14 days prior to symptom onset.

OR

B. A patient with any acute respiratory illness AND having been in contact with a confirmed or probable COVID-19 case (see definition of contact) in the last 14 days prior to symptom onset;

OR

C. A patient with severe acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath; AND requiring hospitalization) AND in the absence of an alternative diagnosis that fully explains the clinical presentation.

- **Probable case**

A. A suspect case for whom testing for the COVID-19 virus is inconclusive. (Inconclusive being the result of the test reported by the laboratory).

OR

B. A suspect case for whom testing could not be performed for any reason.

- **Confirmed case**

A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

Definition of contact

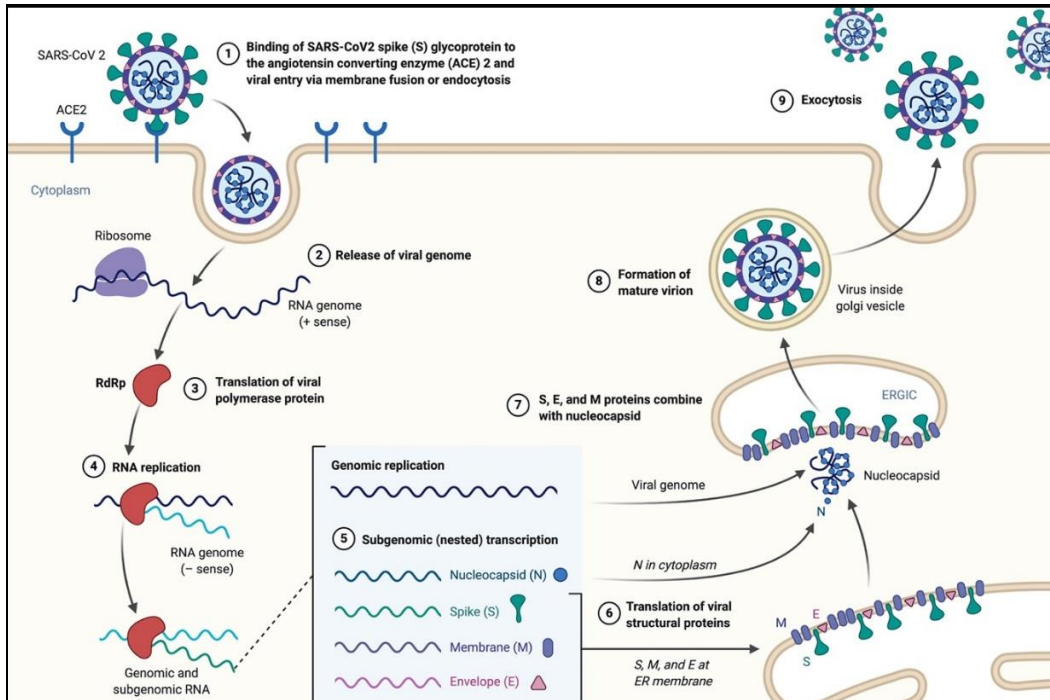
A contact is a person who experienced any one of the following exposures during the 2 days before and the 14 days after the onset of symptoms of a probable or confirmed case:

1. Face-to-face contact with a probable or confirmed case within 1 meter and for more than 15 minutes;
2. Direct physical contact with a probable or confirmed case;
3. Direct care for a patient with probable or confirmed COVID-19 disease without using proper personal protective equipment; OR
4. Other situations as indicated by local risk assessments.

Note: for confirmed asymptomatic cases, the period of contact is measured as the 2 days before through the 14 days after the date on which the sample was taken which led to confirmation.

VI. PECULIAR FEATURE OF SARS –COV 2


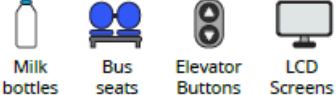









Several analyses have shown that SARS-CoV-2 uses angiotensin-converting enzyme 2 (ACE2) as its receptor. Coronaviruses mainly recognize their corresponding receptors on target cells through S proteins on their surface; entry to the cells results in infection. The population genetic analysis shows that virus evolved in two main genetic types or strains, designated L and S. Although L type is more prevalent and aggressive than S type, the latter was found to be of ancestral origin. [10]

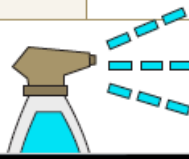


The life cycle and replication of SARS-CoV-2 in the host cells. [11]

The life cycle of SARS-CoV-2 in the host cells. The S glycoproteins of the virion bind to the cellular receptor angiotensin-converting enzyme 2 (ACE2) and enters target cells through an endosomal pathway. Following the entry of the virus into the host cell, the viral RNA is unveiled in the cytoplasm. ORF1a and ORF1ab are translated to produce pp1a and pp1ab polyproteins, which are cleaved by the proteases of the RTC. During replication, RTC drives the production full length (-) RNA copies of the genome and used as templates for full-length (+) RNA genomes. During transcription, a nested set of sub-genomic RNAs (sgRNAs), is produced in a manner of discontinuous transcription (fragmented transcription). Even though these sgRNAs may have several open reading frames (ORFs), only the closest ORF (to the 5' end) will be translated. Following the production of SARS-CoV-2 structural proteins, nucleocapsids are assembled in the cytoplasm and followed by budding into the lumen of the endoplasmic reticulum (ER)-Golgi intermediate compartment. Virions are then released from the infected cells through exocytosis.

HOW LONG DO CORONAVIRUSES LIVE ON SURFACES?

SURFACE	EXAMPLES	DAYS OR HOURS	SURFACE	EXAMPLES	DAYS OR HOURS
Metal	 Doorknobs Silverware Jewelry	5 Days	Plastics	 Milk bottles Bus seats Elevator Buttons LCD Screens	2-3 Days
Ceramics	 Dishes Pottery Mugs	5 Days	Stainless Steel	 Sinks Tinfoil Water bottles	2-3 Days
Glass	 Drinking Glasses Mirrors Windows	UP TO 5 Days	Cardboard	 Shipping boxes	1 Day
Paper	 Newspaper Magazines	UP TO 5 Days	Aluminum	 Refrigerators Cookware Phones	2-8 Hours
Wood	 Furniture, Decking	4 Days	Copper	 Doorknobs Teakettles Cookware	4 Hours
Food/Water	Doesn't seem to spread through food, and has not been found in water. 				



WHAT YOU CAN DO: Disinfect all surfaces and objects in your home daily with a household cleaning spray or wipe. Wash hands for at least 20 seconds with soap and warm water, especially after visiting the supermarket or bringing in packages.

*Coronaviruses are a family of viruses that includes the SARS-CoV-2, the virus that causes COVID-19. This information is for your references only and is changing constantly.

Sources: CDC, FDA.

[<https://www.koiscenter.com/wp-content/uploads/2020/06/02-How-Long-To-Coronaviruses-Live-on-Surfaces.pdf>]

VIII. REFERENCES

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