

# Review of Current Outbreak of Coronavirus Disease (COVID-19)

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**Abstract:** A novel Coronavirus (COVID-19) from the family of coronavirus which includes other viruses such as MERS and SARS as well as the milder variance causing common cold. An outbreak of acute respiratory disease caused by a novel coronavirus (SARS-coV-2) occurred during December 2019 in Wuhan, Hubei province of China. Coronaviruses have been identified in mice, rats, chickens, turkeys, horses, cattle and humans can cause gastroenteritis and upper and lower respiratory tract disease. Clinical manifestations were include fever cough shortness of breath myalgia and fatigue and risk factors associated with severe disease and investigated the causal agents by chest radiography and laboratory testing of nasopharyngeal aspirates sere samples and validation test was performed with the RT-PCR. The treatment consist of promptly implement infection control measures supportive care to relieve symptoms and support organ function. The standard precautions include hand hygiene use of PPE to avoid direct contact with patients' blood, body fluids, secretions (including respiratory secretions) and non-intact skin.

**Key Words:** Novel Coronavirus Disease (COVID-19), SARS-CoV-2, MERS, SARS, Prevention.

## 1. INTRODUCTION:

Coronaviruses, a genus of the family Coronaviridae, are enveloped viruses with a large RNA genome on the plus-strand. The genomic RNA is 27–32 kb in size, capped and poly adenylated. Three serologically distinct groups of coronaviruses have been described. Within each group, viruses are characterized by their host range and genome sequence (1-2), atypical pneumonia, referred to as severe acute respiratory syndrome (SARS) and first identified in Guangdong Province, China, and spread to several countries. The severity of this disease is mortality rate appears to be 3 to 6%, although a recent report suggests this rate can be as high as 43 to 55% in people older than 60 years (3).

The second global case of MERS was identified in a Qatari national who had previously travelled to Saudi Arabia in 2012. The disease was considered a clinical syndrome ranging from asymptomatic cases to respiratory failure to multisystem organ failure(4). Three human coronaviruses have been studied in detail. HCoV-229E and HCoV-OC43 were identified in the mid-1960s, and are known to cause the common cold(5).

A novel coronavirus, designated 2019-nCoV, was identified as the cause of a cluster of pneumonia cases in Wuhan, a city in the Hubei province of China, at the end of 2019. Epidemiologic investigation in Wuhan identified an initial association with a seafood market where most patients had worked or visited(6-7). WHO announced an outbreak of the Novel Coronavirus Disease (COVID-19) as a pandemic on 11 March 2020. As of Saturday (28.03.2020), latest data indicate this novel coronavirus has killed 23,495 people in about three month and a half, with 512,701 cases worldwide. As of 28 March 2020, according to the Ministry of Health & Family Welfare (MoHFW), a total of 873 COVID-19 cases (826 Indians and 47 foreign nationals) have been reported in 27 states/union territories. As number of confirmed cases and deaths have been raising continuously, details of the novel coronavirus in several aspects are still not very clear WHO has named the disease COVID-19, short for “coronavirus disease 2019.

Human coronavirus history started in 1965 when Tyrrell and Bynoe1 discovered that a virus called B814 could be transmitted around. It was found in human embryonic tracheal organ cultures obtained from the respiratory tract of an adult with a common cold (8). Following four viruses have been identified as common causes for respiratory tract diseases in human.

- 229E (alpha coronavirus)
- NL63 (alpha coronavirus)
- OC43 (beta coronavirus)
- HKU1 (beta coronavirus)

Coronaviruses vary significantly in risk factor. Some can kill more than 30% of those infected (such as MERS-CoV), and some are relatively harmless, such as the common cold (9). Coronaviruses cause colds with severe symptoms, such as fever, and sore throats from swollen adenoids, primarily during the winter and early spring seasons (10). Coronaviruses can cause pneumonia (either direct viral pneumonia or secondary bacterial pneumonia) as well as bronchitis (either direct viral bronchitis, or secondary bacterial bronchitis). The much publicized human coronavirus discovered in 2003, SARS-CoV, which causes severe acute respiratory syndrome (SARS), has a unique pathogenesis because it causes both upper and lower respiratory tract infections (11). There are three new coronaviruses have been emerged as a result of this genetic recombination up to now.

- Middle East respiratory syndrome-related coronavirus (MERS-CoV),
- Severe acute respiratory syndrome coronavirus (SARS-CoV)
- Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), previously known as 2019-nCoV.

The coronaviruses HCoV-229E, -NL63, -OC43, and -HKU1 continually circulate in the human population and cause respiratory infections in adults and children world-wide (12).

## 2. SARS:

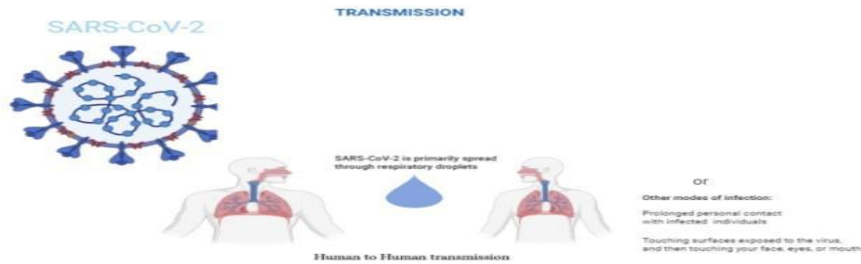
SARS first appeared in 2003, when it appeared in China. The disease spread by direct person-to-person contact with countries in North America, South America, Europe and Greater Asia until the global epidemic later in 2003 was controlled.[13-14]. Two strains of the virus triggered serious respiratory disease outbreaks in humans: SARS-CoV (or SARS-CoV-1), which triggered severe acute respiratory syndrome (SARS) from 2002 to 2003, and SARS-CoV-2, which caused the 2019–20 coronavirus disease pandemic (COVID-19).[15-16]. Bats function as the primary host reservoir for coronavirus associated with SARS. The virus has coevolved over a long period of time at the bat host reservoir.[17] Only recently have strains of SARS-related coronavirus evolved and made the cross-species jump from bats to humans, as in the case of the strains SARS-CoV and SARS-CoV-2. A viral pneumonia that rapidly progresses to respiratory failure. Of infected patients, 20% to 30% required mechanical ventilation and 9.6% died, with higher fatality rates in older patients and those with medical comorbidities. 8098 individuals were infected and 774 died. No reported cases since 2004.[18-19]

## 3 MERS:

MERS coronavirus was identified in 2012 as a cause of severe human respiratory disease[1]. As of 22 November 2013, 157 laboratory-confirmed cases and 19 other suspected MERS cases were identified, of which 69 were fatal[20] Symptoms may range from mild to severe. They include fever, cough, diarrhoea and shortness of breath. For those with other health conditions, disease is usually more serious. Mortality is about one-third of diagnosed cases. [21] As of 2020 there is no specific vaccine or treatment for the disease.[22-23] a number of antiviral medications were being studied. The World Health Organization recommends that those who come into contact with camels regularly wash their hands and do not touch sick camels, and that food items should be cooked properly. People infected can be given medications that help with the symptoms.[21] The high mortality levels in family and hospital outbreaks, especially in patients with co-morbidities such as diabetes and renal failure,[24] and MERS-CoV's respiratory droplet route evoked global concern and intense media debate There is no specific drug treatment for MERS-CoV and supportive therapy remains the mainstay of management. Evidence-based recommendations for therapy were recently formulated and provide a basis for rational decision-making in clinical settings. [25]

## 4. Mode of Transmission:

It is transmitted by the direct contact with infected secretions or large aerosol droplets. Human-to-human transmission has been confirmed and transmission from asymptomatic individuals during the incubation period may occur.  $R_0$  (reproduction number) estimate is 1.4 to 2.5, meaning that every person infected could infect between 1.4 and 2.5 people. [26] The viral incubation period is estimated at ~5 days (95% confidence interval, 4 to 7 days). Chinese authorities have reported that the incubation period may be longer (up to 14 days).



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Figure 1.0 Showing mode transfusion of COVID-19

### 5. Laboratory testing for COVID-19 virus:

Specimens to be collected at minimum, respiratory material should be collected: - upper respiratory specimens: nasopharyngeal and oropharyngeal swab or wash in ambulatory patients - and/or lower respiratory specimens: sputum (if produced) and/or endotracheal aspirate or Broncho alveolar lavage in patients with more severe respiratory disease. Additional clinical specimens may be collected as COVID-19 virus has been detected in blood and stool, as had the coronaviruses responsible for SARS and MERS [27,28,29]. The duration and frequency of shedding of COVID-19 virus in stool and potentially in urine is unknown.

Laboratories performing COVID-19 virus experiments would conform strictly to appropriate biosafety practices.

#### 5.1 Nucleic acid amplification tests (NAAT) for COVID-19 virus

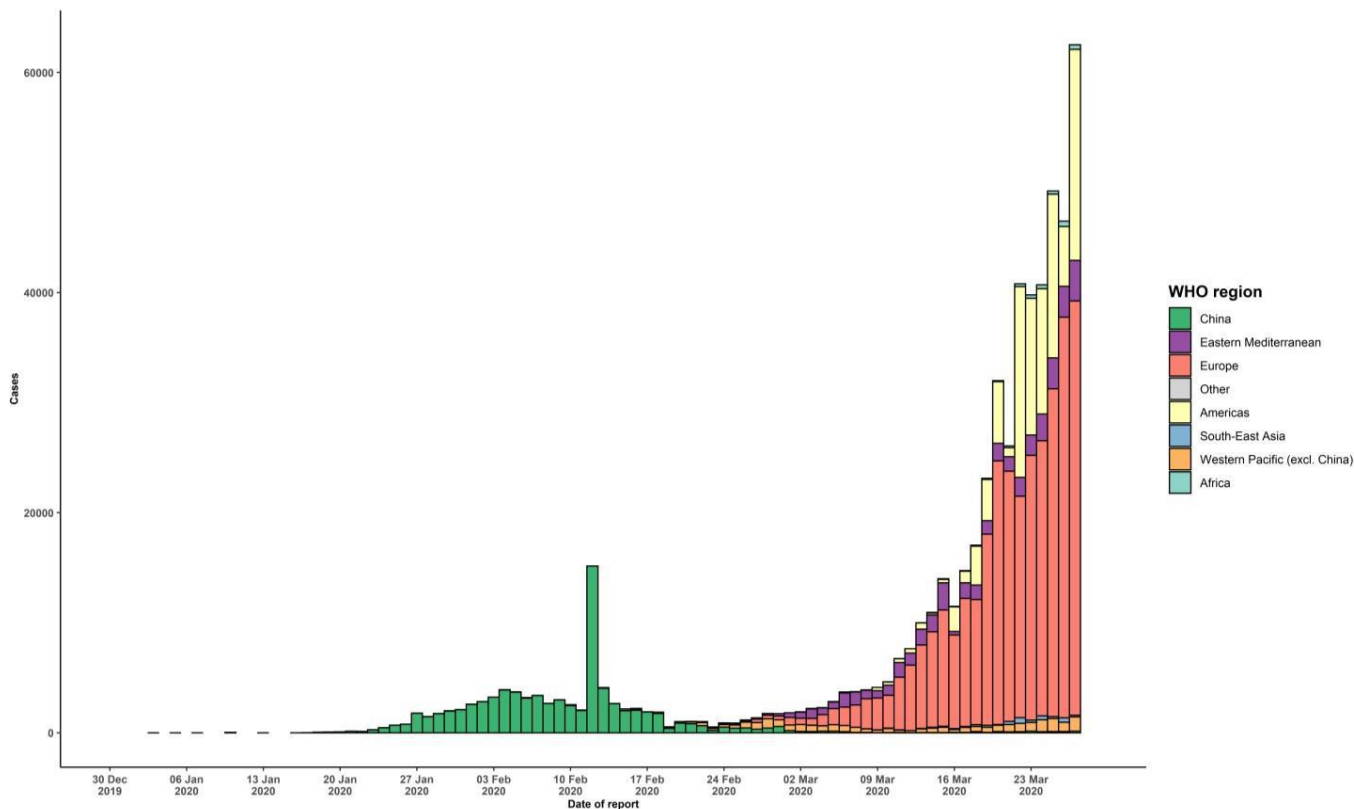
Routine confirmation of cases of COVID-19 is based on detection of unique sequences of virus RNA by NAAT such as real-time reverse transcription polymerase chain reaction (rRT-PCR) with confirmation by nucleic acid sequencing when necessary.[30] The viral genes targeted so far include the N, E, S and RdRP genes. RNA extraction should be done in a biosafety cabinet in a BSL-2 or equivalent facility. Heat treatment of samples prior to RNA extraction is not recommended. Rapid collection and testing of appropriate specimens from patients meeting the suspect case definition for COVID-19 is a priority for clinical management and outbreak control and should be guided by a laboratory expert. Suspect cases should be screened for the virus with nucleic acid amplification tests (NAAT), such as RT-PCR. If testing for COVID-19 is not yet available nationally, specimens should be referred. Operational details of WHO reference laboratories providing confirmatory testing for COVID-19 (Table:1.0) Laboratory investigation list.

Table 1.0 Showing Confirmatory testing for COVID-19 country wise:

Specimen referral for COVID-19 - operational details of WHO reference laboratories providing confirmatory testing for COVID-19*			
	Country	City	Laboratory
1	China	Beijing	China CDC (TBD)
2	China, Hong Kong SAR	Hong Kong	School of Public Health The University of Hong Kong
3	Japan	Nagasaki	Institute of Tropical Medicine, Nagasaki University (WHOCC for Reference and Research on Tropical and Emerging Viral Diseases)
4	Singapore	Singapore	National Public Health Laboratory
5	Australia	Melbourne	Victorial Infectious Diseases Reference Laboratory
6	Thailand	Nonthaburi	National Institute of Health, Department of Medical Sciences, Ministry of Public Health
7	Thailand	Bangkok	Armed Forces Research Institute of Medical Science

8	India	Pune	ICMR - National Institute of Virology
9	USA	Atlanta	Respiratory Viruses Diagnostic Laboratory, US-CDC
10	South Africa	Johannesburg	Centre for Respiratory Diseases and Meningitis, National Institute for Communicable Diseases
11	Senegal	Dakar	Institut Pasteur Dakar
12	Russian Federation	Koltsovo	The State Research Center of Virology and Biotechnology VECTOR
13	Germany	Berlin	German corona virus diagnostic working group: National Consultant Laboratory for Coronaviruses, Institute of Virology, Charité, and WHO Collaborating Centre for Emerging Infections and Biological Threats, Robert Koch Institute
14	The Netherlands	Rotterdam	Erasmus MC Department Viroscience
15	United Kingdom	London	Public Health England
16	France	Paris	Institute Pasteur Paris

Figure 1.1 Epidemic curve of confirmed COVID-19, by date of report and WHO region through 28 March 2020.



**6. Treatment :**

There is no specific anti-viral treatment recommended. Main stay of treatment consists of promptly implement infection control measures, supportive care to relieve symptoms and support organ function.[31] Corticosteroid treatment is not routinely recommended to be used for SARS-CoV-2 pneumonia,1 According to our clinical findings of pulmonary oedema and hyaline membrane development, the timely and sufficient use of corticosteroids along with ventilator support for serious patients should be considered in order to prevent ARDS. Standard precautions also include

prevention of needle-stick or sharps injury; safe waste management; cleaning and disinfection of equipment; and cleaning of the environment.[32]

### 7. Prevention (According to WHO):

There is no vaccine available currently. It has begun developing a vaccine

To avoid infection and to control COVID-19 transmission, do as follows:

- Wash the hands daily with soap and water, or rub the hands with alcohol.
- Maintain a distance of at least 1 meter between coughing or sneezing people to you.
- Avoid touching face.
- If coughing or sneezing, protect the mouth and the nose.
- Stay home if you feel unwell.
- Refrain from smoking and other lung-weakening activities;
- Practice physical distancing by avoiding unnecessary journeys and by keeping away from large groups.

### 8. CONCLUSIONS:

The COVID-19 virus shown a impeccable significant impact on finance, medical and healthcare sectors of India and worldwide. The effect of virus is still unclear in India and better known as the time passes. As a future prospective all countries should aware on this type of animal origin outbreaks efforts should be made to hold back in preventing and steps towards to necessary preventive measures.

### 9. Conflict of Interest disclosure:

The authors declare that they do not have anything to disclose regarding funding or conflict of interest with respect to this manuscript.

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