

# COVID-19: Containment Strategies and Management Options

## MAJOR TIMELINES OF (COVID-2019) OUTBREAK

The number of confirmed cases of the 2019 novel coronavirus disease (COVID-19) reported to the World Human Organization (WHO) continues to rise worldwide, the outbreak of the novel (COVID-19) is regarding a serious threat to global health.<sup>[1]</sup>

Coronavirus is positive polarity RNA with envelope, it related with the zoonotic infection that belongs to Coronaviridae, there are four known genera of coronavirus, but on January 10, 2020, a modern coronavirus in Wuhan in China have been emerged causing the severe pulmonary outbreak, it is recorded as (COVID-19) by the WHO.<sup>[2]</sup>

On December 30, 2019 cluster of cases of pneumonia of unknown origin reported in Wuhan to China National Health Commission, on January 07, 2020, Novel coronavirus isolated for the first time as novel coronavirus, on January 11, 2020, the headmost fatal case reported in China, January 13, 2020, first case reported from Thailand, January 16, 2020, earliest case recorded in Japan.<sup>[3]</sup>

On January 03, 2020, a sum of 44 infections in a human were recorded to the World Health Organization. After just 1 month, the number increased to 17,391 cases have been confirmed worldwide with 2838 new cases, on February 03, 2020.<sup>[4]</sup>

Globally confirmed cases with (COVID-19) until 19 February were reached to 75,204 from those 1872 cases regarding new cases. Just in China 74,280 confirmed infection, while outside of China, 924 cases were confirmed among 25 countries. The total death was 2009, from those 2006 in China alone with a total of 136 new reports cases.<sup>[1]</sup>

On February 26, 2020, 81,109 confirmed cases are reported globally, 78,191 cases in China, 2918 outside of China, the total number of deaths are 2761, among 37 countries.<sup>[5]</sup>

On March 10, 2020, the number of confirmed cases were 113,702 worldwide, while the total death were 4012, the number of infected countries clearly increased to 110. The WHO increases the global level of risks to high level<sup>[6]</sup> [Figure 1].

Most common infected persons with (COVID-19) were men with chronic pulmonary or cardiovascular disorders, hypertension, and diabetes. Infected individuals have a fever, coughing with sputum, headache, and diarrhea. Renal failure may be one of the viral complications.<sup>[7]</sup> The mortality rate of this novel virus is 3%–4% (dividing the total death numbers by the total recorded cases).<sup>[8]</sup>

## CONTAINMENT STRATEGIES BY NATIONS

At present, the number of cases due to the novel (COVID19) is still increased with time, so effective prevention methods

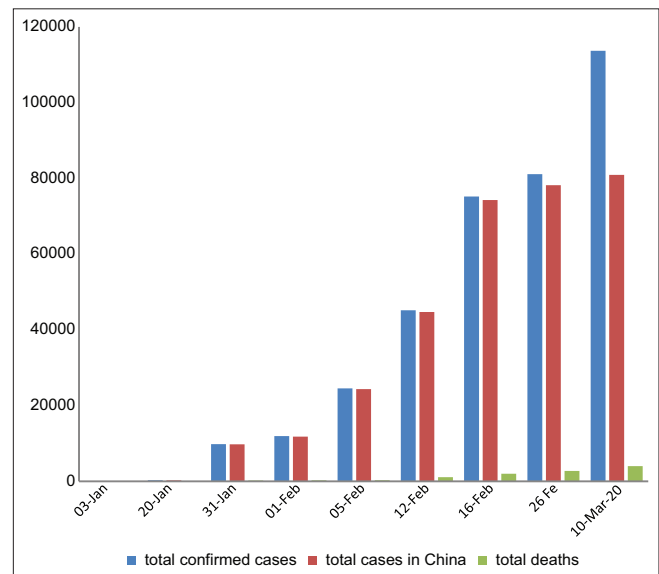


Figure 1: Distribution of total cases and deaths with date

and more effective strategies should be more developed to prevent terrifying pandemic spreading among many countries worldwide<sup>[9]</sup> [Table 1].

Continuous spreading of the novel (COVID19) outside china is expected to infect other countries. Hence, in certain cases, countries may demand operational support to enhance the ability to treat and manage these cases. Clusters of cases outside of China borders represent the risk of localized community transmission.<sup>[3]</sup> Now, the cases of COVID19 in china are decreasing, while the cases outside china is increasing such as Italy (9172 confirmed cases with 463 death), Iran (7161 confirmed cases, 237 death), and South Korea with 7513 cases.<sup>[6]</sup>

There is an urgent to continually evaluate the scope to which measures are efficient and the demand to adopt measures according to the current situation, the effective surveillance of the infection and measures appeared in nations that record interesting cases. Unfavorable health-behaviors and the opposite impact on response measures may appear due to rumors and misinformation by social media.<sup>[3]</sup>

At present, the WHO has no recommendations for trade or travel restrictions but strict applications of the International Health Regulations at airports as well as seaports.<sup>[10]</sup> Future transmission of novel coronavirus can be significantly reduced by activation restrict preventive measures and strong standard infection control.

Governments are under big responsibility to coordinate the various efforts and communications by helping the public, making suitable modifications in many ways as laws

**Table 1: 2019 novel coronavirus outbreak**

Duration	Total confirmed	In china	Out china	Total death	Number of country
3 January	44	44	0	0	1
20 January	282	278	4	6	4
31 January	9826	9780	106	213	20
1 February	11,953	11,821	132	259	24
5 February	24,554	24,363	191	292	24
12 February	45,171	44,730	441	1115	25
19 February	75,204	74,280	924	2009	26
26 February	81,109	78,191	2918	2761	37
10 March	113,702	80,924	32,778	4012	109

and regulations, planning assumptions, and assistance of organizations by providing guidance.<sup>[3]</sup>

One of the most effective strategies to containment novel (COVID19) is by establishing and persisted updating the point of entry countries, and any suspected persons must be granted by medical follow-up, local facilities for management, isolation, specimen collection, and other additional services.<sup>[3]</sup>

Increasing the country response operations is crucial importance for strengthening readiness, diagnosis, identification, and management cases.

Accelerating priority research and supporting fast track studies are required to be the platform for development and candidate therapeutics options, diagnosis, and vaccination regarding this new viral infection.<sup>[3]</sup>

Controlling and containment outbreaks of the novel (COVID19) will demand enough and detailed knowledge regarding its behavior and biological aspects.<sup>[11]</sup> Limited diagnostic testing availability in many countries, nonspecific symptoms of this disease, and co-circulation of other pulmonary infections are factors that may complicate efforts for detecting the virus quickly.

To improve surveillance and track the outbreak of this novel virus, partners must work together to strengthen the global diagnostic ability for COVID19 detection and diagnosis, this detection is critical in limitation spread and strengthening disease control in nations with imported cases, coordination between international laboratories and national laboratories can facilitate confirmation of a new cases.<sup>[3]</sup>

## Therapeutic Options of the Novel (COVID19)

Due to the continuous spreading of the novel COVID19 with the exponential rise in deaths numbers, new therapeutic development is urgent, as well as discovering a new vaccine for this modern virus to decrease this terrifying numbers of deaths.

Until this moment, no specific drug to treat this new virus, organ support in seriously ill individuals, and symptomatic treatment are major steps in clinical management.

To develop specific anti-viral for treating novel COVID19, it takes many years for an evaluation. However, some marketed

drugs to prevent acute respiratory distress syndrome (ARDS) and boost immune responses with safety use still under investigation such as metformin, firates, atorvastin, and besides nutrient supplements.<sup>[12]</sup>

According to the guidelines, interferon (IFN)-alpha that is a broad-spectrum antiviral drug as well as lopinavir/ritonavir is recommended as antiviral therapy. Lopinavir is a protease inhibitor used to treat HIV infection that combined with ritonavir as a booster.<sup>[13]</sup>

In the management of severe acute respiratory syndrome (SARS), compared with ribavirin alone, patients treated with lopinavir/ritonavir and ribavirin had a lower risk of (ARDS) or death.<sup>[14]</sup>

The recommended dosage of lopinavir/ritonavir for novel coronavirus 2019 is higher than that for HIV infection. Hence, based on the modeling study, if lopinavir/ritonavir used for the treatment of novel COVID19, a doubled dosage of the present dosage for HIV infection is required.<sup>[15]</sup>

Oral oseltamivir widely utilized for 2019 novel coronavirus or suspected cases in China hospitals, this anti-viral drug act as neuraminidase inhibitors in influenza,<sup>[16]</sup> neuraminidase inhibitors showed good results as empirical management in middle east respiratory syndrome (MERS-CoV) infection,<sup>[17]</sup> however, there is no accurate evidence that oseltamivir is effective in the treatment of novel COVID19.

Remdesivir may be the excellent drug for the management of novel (COVID19), it can effectively decrease the virus titer of mice infected with (MERS-CoV), improves damaged tissues in the lung, and its efficiency is better than that of the treatment group treated with lopinavir/ritonavir combined with IFN- $\beta$ .<sup>[18]</sup> However, the effectiveness and safety of this drug in patients with 2019 novel coronavirus infection remain demand to be confirmed by more clinical researches.

Host cellular proteins targeting that required for viral replication regarding promise branch to develop rapid viral drugs against different coronaviruses because the whole family shares a very similar but complex replication mechanism to reduce viral load and improve outcome.<sup>[11]</sup>

Ribavirin combined with IFN therapy was effective in the treatment of (MERS-CoV) in an animal model.<sup>[19]</sup>

Zinc and other metal-containing formulations appear to have anti-viral activity, safe, cheap, and readily available. These formulations could be used as adjuncts to monotherapy or as combinational therapies.<sup>[20]</sup>

There is an urgent need for focusing on funding and scientific investments into advancing novel therapeutic interventions for coronavirus infections.

Similar to any novel emerging infection, finding a new vaccine against the virus represents hope. In vaccinology, the primary step for developing a new vaccine is detection the epitope of the pathogen. Based on the bioinformatics

technique, epitope prediction is by computational analysis of the physicochemical properties of the molecule. According to the analysis, the peptide 929EDEE932 is the area with the highest epitope property.<sup>[21]</sup> Monoclonal and polyclonal antibodies to 2019 novel coronavirus could be developed for postexposure.

The high genetic similarity between COVID19 and SARS-CoV, which caused the outbreak in 2003, may be helpful to develop vaccine by screening the experimentally-determined SARS-CoV-derived B-cell and T-cell epitopes in the immunogenic structural proteins of SARS-CoV, derived from the spike (S) and nucleocapsid (N) proteins that map identically to COVID19 proteins. As no mutation has been observed in these identified epitopes among the 120 available COVID19 sequences, immune targeting of these epitopes may potentially offer protection against this novel virus.<sup>[22]</sup>

In general, there are no specific antiviral drugs or vaccines for 2019nCoV.<sup>[23]</sup> All of the drug options come from experience treating SARS, MERS or some other new influenza virus previously. Active symptomatic support remains key to treatment. These drugs above would be helpful and the efficacy needs to be further confirmed. Some drugs that enhance the immunomodulatory effect of the immune response against COVID-19 have been suggested in some studies such as AmB,<sup>[24]</sup> tamoxifen,<sup>[25]</sup> and Itraconazole.<sup>[26]</sup> Besides the antiviral effect of these drugs towards many viral infections.

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### Conflicts of interest

There are no conflicts of interest.

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