

2019 Novel Corona virus (2019-nCoV): Global problem, Global solution

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Dr. Li Wenliang, 34-year-old ophthalmologist, and seven other friends first suspected a viral infection similar to SARS CoV (Severe Acute Respiratory Syndrome corona virus) of 2002-03 in Wuhan, China on December 12, 2019. They warned their colleagues of the coming serious outbreak. It was perceived as a social outcry, and they were reprimanded by the authorities, but it was real. By December 30, 2019, the “outbreak” was official. On January 7, 2020, Chinese researchers showed the full genetic sequence of 2019 nCoV. It shared at least 80% viral genomes with SARS CoV and MERS CoV (Middle East Respiratory Syndrome corona virus). It was thought to have started from a wet market in Wuhan, spillover of the virus to human from its primary reservoir, bats. The number of infected people were reported daily; it went up by 43% every day, and soon 3,000 every day, with a mortality rate of 2%. Wuhan is home to 15 million people. Approximately five million people fled before the whole city was quarantined on January 21, 2020.

An 11,000-bed hospital was constructed in 10 days, and every available convention center was open for people with this illness. Sixty million people lock down. Travel bans to China. Chinese New Year holiday extended by a week. The world’s second largest economy reeling under the pressure of an unprecedented situation never seen before. The death toll has surpassed SARS (774 deaths in 2002-2003) and MERS (859 deaths in 2012). Death toll now stands above 1000 in mainland China, one in Philippines, and one in Hong Kong. Reported illness in 24 countries and five continents. We are barely two months into this human crisis. Remember the movie “*Contagion*.” Dr. Walter Ian Lipkin from Columbia University, famous for his work on SARS, helped to write the script. The drama in this movie is as close as you can get to 2019 novel corona virus epidemiology.

Someone describes this outbreak like unaware toddlers playing happily on the railroad tracks as a train is screeching down the tracks far from them.

2019 Novel Corona virus (2019-nCoV)

- Part of corona virus family
- Shares 75- 86% viral genome with SARS-CoV, MERS-CoV
- Incubation period: 14 days
- Epicenter: Wuhan, capital of Hubei Province, China
- Number of people infected: Unknown
- Asymptomatic people: Unknown
- Death toll: Above 1000
- Average infection: 3000 people a day, slight decline in the last few days. One person can spread to 2.2 persons
- Trajectory of the disease: 500,000 people will get infected, peak in late February to early March 2020
- Primary reservoir: Bats
- Mode of transmission: Bats to human, human to human, and may involve an intermediary host
- Transmission dynamics: Unknown
- Symptoms: Fever, fatigue, myalgia, dyspnea, headache, abdominal pain
- Clinical presentation: Pneumonia, multiorgan failure, ARDS
- Severity index: 15%

- Mortality rate: 2- 4 %
- Diagnostic test: Quantitative reverse- transcriptase-polymerase chain- reaction (qRT-PCR) assay. Now available as: CDC 2019-nCoV Real Time Reverse Transcriptase (RT)-PCR Diagnostic panel
- Treatment: Supportive
- Preventive measures: Facial mask, hand washing, avoid touching face, eye protection with goggles
- Clinical trial: Antiviral remdesivir and hydroxychloroquine, human trial starting in 2- 3 months
- Corona virus vaccine: On the way

A case report of first patient in the USA from the Washington State 2019- nCoV Case Investigations Team was published in *New England Journal of Medicine* on January 31, 2020. An individual returned from Wuhan, China. He never visited the wet market. Human to human transmission theory is proposed. It described the natural history and clinical disease. It took at least 10 days before the diagnosis was confirmed. Samples were collected from nasopharyngeal and oropharyngeal routes, along with stool and serum tests, and sent to CDC (Centers for Disease Control and Prevention). Significance of extra pulmonary viral RNA was not clear.

Now CDC has circulated a form for Patient under Investigation (PUI), and it can be downloaded from CDC site. The test kits are now available at state level. CDC last updated the outbreak on February 1, 2020. Dr Anthony Fauci, MD Director of the National Institutes of Allergy and Infectious Disease also announced the randomized trial of the antiviral remdesivir in China. CDC is working closely with China CDC.

Clinical Characteristics of 138 Hospitalized Patients with 2019 Novel Corona Virus Infected Pneumonia in Wuhan China: Dawei Wang, MD, Bo Hu, MD, ChangHu, MD, et al.
JAMA, February 7, 2020.

This paper brings the severity of the cases in the hospital. Median age was 56-years, both male and female in equal proportions, 26% admitted to ICU, 36 % discharged to home, with a mortality rate of 4.6 %. At the time of publication, there were still people in the hospital from this group study. Once again, rapid human to human transmission among close contacts was an important feature.

You cannot predict but time matters. Someone said it so right.

2019- nCoV grows better in human airway epithelial cells than in tissue culture cells unlike SARS-CoV and MERS-CoV. Enhanced binding to hACE2 (human angiotension- converting Enzyme 2) was also shown in the recent works. Pandemic H1N1 binding to upper respiratory tract receptors caused mild disease, and on the other hand avian H7N9 virus binding to lower respiratory tract caused more mortality. It seems when virus resides in the upper respiratory receptors, it spreads faster with lower mortality rate. Is it what we are seeing here? Almost every 10 years, corona virus seems to spillover to human.

SARS-CoV was eventually contained by means of syndromic surveillance, isolation of the patients and quarantine of the contacts. And that is what we are doing today. Fortunately, there is evidence coming that remdesivir, which treated Ebola virus infection, is showing great promise. There is plan for vaccine to corona virus. Focus is now in Africa, where there is some lacking in preparedness to fight this onslaught.

Reporting of outbreak of SARS-CoV was delayed by 6 months. We did better this time, just about a month. There are things we disagree, disapprove, but transparency is better now, and we are moving in the right direction. There are so many unknowns in this equation -culture, belief and traditions. Simply we cannot blame people.

Dr. Li Wenliang contracted the illness himself and passed away on February 2, 2020. There has been an outpouring of praise, tributes and support from the whole country. He left behind a child, pregnant wife and mother. His proud mother said she was happy that her son was brave, served the country, and did what he loved to do. What a beautiful story of duty above personal safety. Doctors of China have shown such a bravery, expertise and selfless dedications in this tragic crisis in our time. They have brought the meaning of selfless service to humanity. We are sad and hurt but proud of you.