



2019-nCoV Literature Situation Report (Lit Rep) February 25, 2020

Key Takeaways

- ☒ **Increasingly, modelling papers suggest that the movement restrictions implemented in Wuhan on January 25th appear to have had an impact on the rate of spread outside of Hubei Province.**
- ☒ **Quantitative reverse transcription PCR (qRT-PCR) is currently the standard for COVID-19 detection; however, Reverse Transcription Loop-Mediated Isothermal Amplification (RTLAMP) may allow for faster and cheaper field-based testing.**
- ☒ **Researches have highlighted the benefits of using a one-health (animal-human-environment) modelling approach to improve our understanding SARS-CoV-2 epidemiology, particularly in the context of fresh meat and seafood markets in China.**

Transmission and Global Spread

- Lu et al (2020) evaluated the impact of disease control and prevention on epidemic dynamics and clinical features of the COVID-19 outbreak in Shanghai. They report a reduction in transmission of 99% within Shanghai and that the exponential growth had so far been stopped. They conclude that strict control of transmission at the early stage of an epidemic in major cities can quickly slow disease spread while control in local clusters is key to prevent outbreaks from imported cases.
Lu et al. (Feb 19, 2020). A descriptive study of the impact of diseases control and prevention on the epidemics 1 dynamics and clinical features of SARS-CoV-2 outbreak in Shanghai, lessons learned for 2 metropolis epidemics prevention. Pre-print downloaded Feb 25 from <https://doi.org/10.1101/2020.02.19.20025031>

Clinical Characteristics and Health Care Setting

- Hao et al report on an atypical COVID-19 case in a 60 -year old man manifesting mainly as fatigue. The patient did not have fever or respiratory symptoms. Diagnosis was confirmed by epidemiological characteristics, chest imaging, and lab findings. There is need to expand case definition for better case management and understanding of epidemiology of the illness.
Hao et al. (Feb 20, 2020). First Atypical case of 2019 novel coronavirus in Yan'an, China. Clinical Microbiology and Infection. <https://doi.org/10.1016/j.cmi.2020.02.011>
- In the absence of any findings from known animal source of human novel coronavirus (SARS-CoV-2) infection, Jalava (2020) reports that wide contamination of seafood (seafood and fish tanks) and wildlife markets might explain the initiation of the SARS-CoV-2 outbreak. A comparative study of genetic sequences will not be adequate to resolve and provide credible evidence of sources. Rather, efforts must build supporting epidemiologic evidence to link human cases with animal or food exposures. The author proposes time-place-person models to establish causation.
Jalava (May 2020): First respiratory transmitted food borne outbreak? International Journal of Hygiene and Environmental Health. <https://doi.org/10.1016/j.ijheh.2020.113490>
- Kim et al. report that data on viral load kinetics in confirmed cases are lacking. They present distinct viral load kinetics of the first two confirmed patients with mild to moderate illnesses in Korea. The

findings suggest that viral load kinetics of SARS-CoV-2 may be different from that of other coronavirus infection.

Kim et al. (Feb 24, 2020). Viral Load Kinetics of SARS-CoV-2 Infection in First Two Patients in Korea. J Korean Med Sci. <https://doi.org/10.3346/jkms.2020.35.e86>

- The authors report viral dynamics in clinical specimens (throat swabs, sputum, urine, and stool) of 82 COVID-19 patients using N-gene-specific quantitative RT-PCR assay. The findings from viral loads and peak periods of virus in different samples are reported. The timelines when the patients are infectious and when and what type of samples to take for diagnosis are provided.

Pan et al (2020): Lancet Infect Dis 2020 Published Online February 24, 2020. [https://doi.org/10.1016/S1473-3099\(20\)30113-4](https://doi.org/10.1016/S1473-3099(20)30113-4)

- Quantitative reverse transcription PCR (qRT-PCR) is currently the standard for COVID-19 detection; however, Reverse Transcription Loop-Mediated Isothermal Amplification (RTLAMP) may allow for faster and cheaper field based testing at point-of-risk. RT-LAMP can be performed in under 30 mins and specifically detected COVID-19 in simulated patient samples. The test has potential for use in monitoring of exposed individuals or potentially in screening efforts in the field and potential ports of entry.

Lamb et al. (Feb 24, 2020). Rapid Detection of Novel Coronavirus (COVID-19) by Reverse Transcription-Loop-Mediated Isothermal Amplification. Pre-print downloaded Feb 25 from <https://doi.org/10.1101/2020.02.19.20025155>

- Lim et al. track the origin of SARS-CoV-2 infections in South Korea. They report on clinical findings and case management of the index patient who was the first to cause tertiary transmission outside China. Interestingly, after lopinavir/ritonavir (Kaletra, AbbVie) was administered, β -coronavirus viral loads significantly decreased and no or little coronavirus titers were observed.

Lim et al (Feb 17, 2020). Case of the Index Patient Who Caused Tertiary Transmission of Coronavirus Disease 2019 in Korea: the Application of Lopinavir/Ritonavir for the Treatment of COVID-19 Pneumonia Monitored by Quantitative RT-PCR. J Korean Med Sci. <https://doi.org/10.3346/jkms.2020.35.e79>

Public Health Policy and Practice

- This MMWR report summarizes U.S. public health efforts slow and to contain transmission of COVID-19. Measures include case and contact identification, recommended assessment, monitoring, and care of travelers arriving from areas with substantial COVID-19 transmission. Interim guidance is available at <https://www.cdc.gov/coronavirus/index.html>

Jernigan (Feb 25, 2020). CDC COVID-19 Response Team: CDC Morbidity and Mortality Weekly Report. Update: Public Health Response to the Coronavirus Disease 2019 Outbreak —United States, February 24, 2020

https://www.cdc.gov/mmwr/volumes/69/wr/mm6908e1.htm?s_cid=mm6908e1_w

- This report details how Chinese traffic restrictions in Hubei Province. Preliminary data suggest the effectiveness of these restrictions for this outbreak thus far. These measures involved consultation with public health experts, the government, and the general public. This experience will provide valuable lessons for quickly coordinating and coping with future public health emergencies.

Pan et al. (Feb 20, 2020). Lessons learned from the 2019-nCoV epidemic on prevention of future infectious Diseases. Microbes and Infection. <https://doi.org/10.1016/j.micinf.2020.02.004>

Modelling

- Lai et al used 15 2019-nCoV genomes to reconstruct the evolutionary dynamics of the COVID-19 outbreak, demonstrating the usefulness of phylogeny in supporting the surveillance of emerging new infections even as the epidemic is growing.

Lai et al (Feb 23, 2020): Early phylogenetic estimate of the effective reproduction number of 2019-nCoV. Pre-print downloaded Feb 25 from <https://doi.org/10.1101/2020.02.19.20024851>

- Pan et al. developed two mathematical SEIR models to simulate the current COVID-19 outbreak. The models predicted decline of the basic reproductive number R_0 from 5.75 to 1.69 in Wuhan and 6.22 to 1.67 elsewhere in China from 19 January to 16 February 2020. The results also predict the peak of new asymptomatic cases per day, new symptomatic infections, and COVID-19 inpatients in Wuhan. Models suggest that the number of confirmed cases may decrease to less than 10 on March 27 in Wuhan and March 19 in the other parts of China.

Pan et al. (Feb 23, 2020). Effectiveness of intervention strategies for Coronavirus Disease 2019 and an estimation of its 1 peak time: Pre-print downloaded Feb 25 from <https://doi.org/10.1101/2020.02.19.20025387>

Commentary

- In this commentary, authors report why CT has become an important imaging modality in assisting in the diagnosis and management of patients with COVID-19 pneumonia, and further report on the emerging radiological appearances of COVID-19 pneumonia.

Lee et al. (Feb 24, 2020). COVID-19 pneumonia: what has CT taught us? Lancet Infect Dis. [https://doi.org/10.1016/S1473-3099\(20\)30134-1](https://doi.org/10.1016/S1473-3099(20)30134-1)

- Li and Liu (2020) summarize the characteristics of genes and receptors, antiviral therapy, and early warning and prediction for 2019-nCoV. They describe the importance of vaccine development and recommend that relevant research be carried out in specific laboratories during the outbreak.

Li and Liu (2020). Puzzle of highly pathogenic human coronaviruses (2019-nCoV). Protein Cell. <https://doi.org/10.1007/s13238-020-00693-y>