2019-nCoV Literature Situation Report (Lit Rep)
February 18, 2020

Key Takeaways

- **Several new papers have used modelling and prediction techniques to assess the pandemic potential of COVID-19, exploring the effectiveness of travel restrictions and other infection control measures. On their own, environmental conditions (e.g., seasonality and humidity changes) appear unlikely to slow the spread of the outbreak.**
- **Ideal and alternative diagnostic strategies are being evaluated, with particular attention to the shortages in RT-PCR testing supplies.**
- **Singapore is often lauded for its excellent disease detection capacity. Compared to Singapore, global disease detection capacity appears to be around 38%, with only about 40% capacity in other countries with strong surveillance.**

Transmission and Global Spread

- Using data on Japanese travelers evacuated from Wuhan, researchers estimate the proportion of infected COVID-19 patients who are asymptomatic (asymptomatic ratio). Recognizing the limitations of the data used in their estimation, the authors conclude that as many as half of all COVID-19 cases may be asymptomatic.

  Nishiura et al. (Feb 17, 2020). Estimation of the asymptomatic ratio of novel coronavirus infections (COVID-19). Pre-print downloaded Feb 18 from https://doi.org/10.1101/2020.02.03.20020248

- Researchers estimate that prior to the Wuhan travel shutdown (Jan 23, 202), 86% of all COVID-19 infections were undocumented. They also estimate that these undocumented cases were about half as contagious as documented infection. Undocumented cases prior to the Wuhan quarantine likely explain the rapid geographic spread of the virus.

  Li et al. (Feb 17, 2020). Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (COVID-19). Pre-print downloaded Feb 18 from https://doi.org/10.1101/2020.02.14.20023127

- Researchers estimated that the global capacity to detect imported cases of COVID-19 is about 38% that of Singapore, which has historically had strong disease detection capacity. High surveillance countries have about 40% Singapore's detection capacity compared to 37% in intermediate surveillance countries and 11% in low surveillance countries.
- If all countries had the same detection capacity as Singapore, 2.8 times as many imported cases could have been detected during the study period.
- Assuming perfect detection in travelers (due to increased screening procedures), the authors estimate that cases in Wuhan may be under-detected by seven fold. They also suggest the plausibility that many undetected cases have been exported to other countries.

Niehus et al. (Feb 14, 2020). Estimating underdetection of internationally imported COVID-19 cases. Pre-print downloaded Feb 18 from https://doi.org/10.1101/2020.02.13.20022707

- The first imported case of COVID-19 was identified in Canada. The authors describe the mild clinical presentation and discuss the possibility of home isolation for mild cases.

  Silverstein (Feb 13, 2020). First imported case of 2019 novel coronavirus in Canada, presenting as mild pneumonia. The Lancet. https://doi.org/10.1016/S0140-6736(20)30370-6

Modelling and Prediction

- Researchers use data on the seasonal variation of four endemic coronaviruses to model the effect of seasonal variation on a potential COVID-19 pandemic. They conclude that seasonality may, in combination with infection control processes, contribute to a slowing of the outbreak but that it seems likely this virus will shift into a seasonal endemic pattern like other coronaviruses.

  Neher et al. (Feb 17, 2020). Impact of seasonal forcing on a potential SARS-CoV-2 pandemic. Pre-print downloaded Feb 18 from https://doi.org/10.1101/2020.02.13.20022806

- Researchers evaluated absolute humidity and transmission of COVID-19. They found that high humidity will not necessarily limit the survival and transmission of the virus.
- Sustained and exponential disease transmission can occur across a range of humidity conditions. Thus, changes in weather will likely not lead to reduced case counts without extensive public health interventions.

  Luo et al. (Feb 17, 2020). The role of absolute humidity on transmission rates of the COVID-19 outbreak. Pre-print downloaded Feb 18 from https://doi.org/10.1101/2020.02.12.20022467

- Tomie modelled COVID-19 incidence data for Wuhan, Hubei Province excluding Wuhan, and mainland China excluding Hubei. The model suggests that the number of new cases outside of Wuhan will be negligible by the end of February if the current trends do not change. Daily fluctuation in Wuhan makes predicting the end of the outbreak there more difficult.

  Tomie (Feb 14, 2020). Understanding the present status and forecasting of COVID—19 in Wuhan. Pre-print downloaded Feb 18 from https://doi.org/10.1101/2020.02.13.20022251

Clinical Characteristics and Health Care Setting

- Researchers reviewed 2,007 COVID-19 cases in china and identified 18 with a history of cancer, higher than the overall incidence of cancer in the general Chinese population. Lung cancer was most common (5/18). Specific characteristics of these patients and clinical outcomes are described.

  Liang et al. (Feb 14, 2020). Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. The Lancet Oncology. https://doi.org/10.1016/S1470-2045(20)30096-6

- Ai et al. conducted a prospective study to identify an optimal diagnostic strategy for COVID-19 pneumonia which includes a combination of CT, RT-PCR, and multi-plex PCR.

  Ai et al. (Feb 17, 2020). Optimizing diagnostic strategy for novel coronavirus pneumonia, a multi-center study in Eastern China. Pre-print downloaded Feb 18 from https://doi.org/10.1101/2020.02.13.20022673

- Researchers discuss the potential utility of including eosinopenia in early diagnostic assessment for COVID-19 and its reliability compared to leukocyte counts and lymphopenia.

Li et al. (Feb 17, 2020). A simple laboratory parameter facilitates early identification of COVID-19 patients. Pre-print downloaded Feb 18 from https://doi.org/10.1101/2020.02.13.20022830

- New research describes the possibility of using artificial intelligence deep learning methods to review CT images and radiographical changes to facilitate earlier diagnosis at a time when diagnostic resources remain scarce. Sensitivity of the test was 74% and specificity was 67%.

  Wang et al. (Feb 17, 2020). A deep learning algorithm using CT images to screen for Corona Virus Disease (COVID-19). Pre-print downloaded Feb 18 from https://doi.org/10.1101/2020.02.14.20023028

- In this correspondence, authors describe several recent incidents in *clinical* settings that suggest the possible asymptomatic transmission of 2019-nCoV. They highlight the need for high-level personal protective equipment for health care workers, even when working with subclinical patients and those who have recovered from acute illness.

  Chang et al. (Feb 13, 2020) Protecting health-care workers from subclinical coronavirus infection. https://doi.org/10.1016/S2213-2600(20)30066-7

Public Health Policy and Practice

- An evacuation of 126 persons from Wuhan to Frankfurt, Germany, employed a symptom-based screening process that failed to detect 2 persons who subsequently tested positive for COVID-19. Neither patient developed fever nor respiratory symptoms during 7 days of hospitalization suggesting the potential for viral shedding among asymptomatic or mildly symptomatic people.

  Hiehl et al. (Feb 18, 2020). Evidence of SARS-CoV-2 Infection in Returning Travelers from Wuhan, China. NEJM. https://www.nejm.org/doi/full/10.1056/NEJMc2001899?query=RP

- In this brief commentary, Kavanagh discusses the potential effects of autocratic and information politics on successful and rapid outbreak response.

  Kavanagh (Feb 13, 2020). Authoritarianism, outbreaks, and information politics. The Lancet. https://doi.org/10.1016/S2468-2667(20)30030-X

- Habibi et al. reflect on potential violations of the International Health Regulations, in particular Article 43 which restricts what measures countries can implement when responding to public health risks, requiring that the measures by "supported by science, in commensurate with the risks involved, and anchored in human rights."

  Habibi et al. (Feb 13, 2020). Do not violate the International Health Regulations during the COVID-19 outbreak. The Lancet. https://doi.org/10.1016/S0140-6736(20)30373-1

Mental Health and Personal Impact

Reviewed by Dr. Tona McGuire, clinical psychologist, co-lead of the DOH Behavioral Health Strike Team, co-founder of the Health Support Team, and instructor in disaster behavioral health.

- With a shortage of Mental Health professionals, other healthcare workers are stepping in to develop creative ways to help patients and themselves manage the stress involved in quarantine in "shelter hospitals". Mental health providers regularly visit, and have set up chat groups, online forums, radio stations, book clubs, and hotlines for patients and staff. Staff in full PPE and patients also do Tai Chi and Square Dancing to relieve stress, calling it the "Safety Dance". Read the full story here.