2019-nCoV Literature Situation Report (Lit Rep)
January 31, 2020

Key Takeaways

- **A second case of 2019-nCoV was identified in Germany resulting from apparent asymptomatic transmission from an infected Chinese traveler.**
- **Several studies suggest that movement and travel restrictions in China remain important for curbing the spread of the outbreak and that there is a risk of self-sustained outbreaks in major cities where travel from Wuhan was high in the days leading up to the region's movement restrictions.**
- **Phylogenetic studies of the origin of the virus continue to be published, with one recent report suggesting that the virus may have been circulating among humans as many as 200 days before the outbreak was detected in December.**

Transmission

- On 1/28 potential asymptomatic transmission of 2019-nCoV was identified in Germany. A new report indicates a second person was infected by the same asymptomatic traveler from China.
- The virus seems to have been transmitted during the index patient's incubation period. Once symptoms did develop, the index patient experiences brief and nonspecific symptoms.
- High sputum viral load in the first asymptomatically-infected patient raises concerns about potential prolonged viral shedding after recovery.

  Rothe et al. (Jan 30, 2020). Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany. NEJM.
  https://www.nejm.org/doi/full/10.1056/NEJMc2001468?query=featured_coronavirus

- In this commentary, authors discuss the use of a cordon sanitaire (cordoned off area where movement is restricted) in Wuhan and suggestions for slowing the spread of the outbreak, including the issues associated with involuntary social isolation.

  Phelan et al. (Jan 30, 2020). The Novel Coronavirus Originating in Wuhan, China Challenges for Global Health Governance. JAMA Viewpoint.
  https://jamanetwork.com/journals/jama/fullarticle/2760500

- Researchers constructed a model to assess the effectiveness of three control measures (isolation of ill persons, restricted human mobility, and improving treatment) at reducing the spread of the outbreak. Findings suggest that public health interventions that restrict movement remain necessary, particularly if asymptomatic transmission is widespread (which has yet to be determined).

  Shao and Shan (Jan 28, 2020). Beware of asymptomatic transmission: Study on 2019-nCoV prevention and control measures based on extended SEIR model. Pre Print.
  https://www.biorxiv.org/content/10.1101/2020.01.28.923169v1.full.pdf

- Epidemiologic characteristics of confirmed cases of 2019-nCoV in China up to January 23 were used to produce time-dependent reproductive numbers. Findings suggest that the rate at which secondary cases are appearing may have been decreasing over the last few weeks.

  Liu et al. (Jan 26, 2020). Transmission dynamics of 2019 novel coronavirus (2019-nCoV). Pre-Print. https://www.biorxiv.org/content/10.1101/2020.01.25.919787v1

Modelling and Prediction

- Using available data, researchers estimated the number of cases that have already been exported from Wuhan to other Chinese cities and forecasted the spread within and outside of mainland China. They estimate an R_0 of 2.69 (95% CI: 2.47-2.86) and, as of Jan 25, 75,815 infections (95% CI: 37,304-130,330) in Wuhan alone.
- Findings suggest a strong likelihood of self-sustaining outbreaks in major cities globally, especially where asymptomatic travel persists in the absence of strong public health intervention and movement restrictions. They call for strong personal and public health prevention measures in all cities with regular travel structures to and from Wuhan and other cities with known sustained transmission.

    Wu et al. (Jan 31, 2020). Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. Lancet.
    https://www.thelancet.com/action/showPdf?pii=S0140-6736%2820%2930260-9
    Summary press conference slides:
    https://www.med.hku.hk/f/news/3549/7418/Wuhan-coronavirus-outbreak_AN-UPDATE_20200127.pdf

- Researchers estimated burden on isolation and intensive care units in Wuhan accounting for the effect of successful public health intervention and diagnosis rates. With a 50% diagnosis rate and in the absence of any public health intervention efforts, the number of infected cases is anticipated to exceed other reported estimates (as of Jan 31), producing tremendous burden on the health care system. If public health interventions are 70% effective, the burden would be reduced significantly.
- Findings emphasize the importance of public health efforts to reduce transmission.

    Ming et al. (Jan 28, 2020). Breaking down of healthcare system: Mathematical modelling for controlling the novel coronavirus (2019-nCoV) outbreak in Wuhan, China. Pre-Print.
    https://www.biorxiv.org/content/10.1101/2020.01.27.922443v2

Clinical Information

- An assessment of commercially available medications found up to 10 that may be useful in treating 2019-nCoV.

    Liu and Wang (Jan 29, 2020). Potential inhibitors for 20192019-nCoV coronavirus M protease from clinically approved medicines. Pre Print.
    https://www.biorxiv.org/content/10.1101/2020.01.29.924100v1

Origins, Reservoir, and Virus Background

- A new phylogenetic study suggests that there may have been two different viral strains of 2019-nCoV circulating as early as a few months prior to the initial detection of the outbreak. Evidence also indicates that the Huanan seafood market at the center of early surveillance efforts may in fact not have been the primary starting point of the outbreak.

    Xiong et al. (Jan 30, 2020). Evolution and variation of 2019-novel coronavirus. Pre Print.
    https://www.biorxiv.org/content/10.1101/2020.01.30.926477v1.full.pdf

Additional Resources

- Our terrific Washington team was published in the New England Journal of Medicine today, discussing the first U.S. case of 2019-nCoV. You can read the full text here: https://www.nejm.org/doi/pdf/10.1056/NEJMoa2001191
- Boston Children's Hospital is tracking all publicly reported cases of 2019-nCoV in an interactive map: https://www.healthmap.org/ncov2019/
- Statement on the Second Meeting of the International Health Regulations (2005) Emergency Committee Regarding the Outbreak of Novel Coronavirus (*2019-nCoV*)

In addition to the articles described here, there are several editorials, commentaries, and technical (e.g., drug trial) papers available to view via the 2019-nCoV SharePoint site along with previous Lit Reps.