2019-nCoV Literature Situation Report (Lit Rep)
February 27, 2020

Key Takeaways

- **There remains no evidence that SARS-CoV-2 can be transmitted sexually.**
- **Predictive models suggest that COVID-19 transmission will be highest across Eastern Europe and Japan, and lowest across Africa, Central America, and South-Western Asia due to population demographics, including age distribution.**
- **Increasingly, estimates of case fatality risk are using time-adjusted denominators rather than the number of known deaths divided by the number of all known cases at a particular point in time to produce a more accurate epidemiologic picture.**

Transmission Dynamics

- Cui et al. investigated possible sexual transmission of SARS-CoV-2 in 35 female patients diagnosed with COVID-19 using RT-PCR, to detect SARS-CoV-2 in vaginal environment and anal swab samples. All vaginal samples tested negative and only one anal swab sample tested positive. The results from this study do not indicate sexual transmission of SARS-CoV-2.

  Cui et al. (Feb 27, 2020). Clinical features and sexual transmission potential of SARS-CoV-2 infected female patients: a descriptive study in Wuhan, China. Pre-print downloaded Feb 27 from https://doi.org/10.1101/2020.02.26.20028225

- Huh et al. discuss emergent strategies for the next phase of COVID-19. Their review of transmission dynamics from the earliest period of the outbreak showed characteristics such as; relatively large proportion of mild cases, high viral shedding at the symptom onset, and a slowly progressive clinical course, make containment difficult and undermine the effectiveness of the classic "search and isolate" strategy.

  Huh et al (Feb 25, 2020). Emergent Strategies for the Next Phase of COVID-19. Infection and Chemotherapy. https://www.icjournal.org/DOIx.php?id=10.3947/ic.2020.52.e6

Virology

- Zhang et al. reported evolution of COVID-19 strains to form two well-supported clades (Type I and II). Type II strains likely evolved from Type I and are more prevalent than Type I among infected patients. Second, by analyzing the three genomic sites distinguishing Type I and Type II strains, they found that the synonymous changes at two of the three sites confer higher protein translational efficiencies in Type II strains than in Type I strains, which explains why Type II strains are more contagious (transmissible) than Type I. These findings could be valuable for the current epidemic prevention and control.

  Zang et al. (Feb 27, 2020). Genomic variations of COVID-19 suggest multiple outbreak sources of transmission. Pre-print downloaded Feb 27 from https://doi.org/10.1101/2020.02.25.20027953

- The search for possible intermediate hosts of SARS-CoV-2 is still ongoing.

    Liu et al. (Feb 27, 2020) Composition and divergence of coronavirus spike proteins and host ACE2 receptors predict potential intermediate hosts of SARS-CoV-2. Pre-print downloaded Feb 27 from https://doi.org/10.1002/jmv.25726

- Xu et al. provide a detailed systematic review and comparison of two animal-to human transmitted human coronaviruses, SARS-COV and SARS-CoV-2, in the context of virus incubation, originations, diagnosis and treatment methods, genomic and proteomic sequences, and pathogenic mechanisms.

    Xu et al. (Feb 22, 2020). Systematic Comparison of Two Animal-to-Human Transmitted Human Coronaviruses: SARS-CoV-2 and SARS-CoV. Viruses. https://doi.org/10.3390/v12020244

Modelling and Prediction

- Hilton and Keeling, in their estimation of country-level basic reproductive ratios for novel Coronavirus (COVID-19) using synthetic contact matrices, predict that R0 will be highest across Eastern Europe and Japan, and lowest across Africa, Central America and South-Western Asia. They argue that this pattern is largely driven by the demographics; ratio of children to older adults in each country and the observed propensity of clinical cases in the elderly.

    Hilton and Keeling (Feb 27, 2020). Estimation of country-level basic reproductive ratios for novel Coronavirus (COVID-19) using synthetic contact matrices Pre-print downloaded Feb 27, 2020 from https://doi.org/10.1101/2020.02.26.20028167

- Qi et al. propose calculating case fatality risk by dividing the number of known deaths by the number of confirmed cases "T" days before, where "T" is an average time period from case confirmation to death. This approach could be used for diseases to calculate CFR before a pandemic ends.

    Qi et al (Feb 26, 2020): Case fatality rate of novel coronavirus disease 2019 in China. Pre-print downloaded Feb 27 from https://doi.org/10.1101/2020.02.26.20028076

- Kobayashi et al. reviewed key epidemiological problems with using case fatality rate (CFR) and infection fatality rate (IFR) to assess severity of COVID-19. They concluded that division of the cumulative number of deaths by that of cases should be adjusted by the delay in time from illness onset to reporting. They caution that assessing only confirmed cases among all infections offers limited insight into the severity among all infected individuals, and the IFR are reduced by a shorter virus detection window and lower RT-PCR sensitivity.

    Kobayashi et al (Feb 21, 2020). Communicating the Risk of Death from Novel Coronavirus Disease (COVID-19). J Clin Med. https://doi.org/10.3390/jcm9020580

Clinical Characteristics and Health Care Setting

- Gong et al. analyzed correlation between disease severity and inflammation-related parameters in patients with COVID-19 pneumonia. They analyzed blood inflammation indicators among mild, severe, and critical patients, to help identify severe or critical patients early. They report age, interleukin-2 receptor, C-reactive protein, Ferro-protein, white blood cell and lymphocyte counts should be closely observed. IL-6, TNFα and IL-8 might be promising therapeutic targets.

    Gong et al. (Feb 27, 2020). Correlation Analysis between Disease Severity and Inflammation-related Parameters in Patients with COVID-19 Pneumonia. Pre-print downloaded Feb 27 from https://doi.org/10.1101/2020.02.25.20025643

- He et al. evaluated the spectrum of comorbidities and its impact on the clinical outcome in patients with coronavirus disease 2019 (COVID-19). They report comorbidities were present in 25% of patients with COVID-19 in China and were associated with poorer clinical outcomes.
    He et al. (Feb 27, 2020). Comorbidity and its impact on 1,590 patients with COVID-19 in China: A Nationwide Analysis. Pre-print downloaded Feb 27 from https://doi.org/10.1101/2020.02.25.20027664

- Hui and team investigated risk of cardiac injury in patients with 2019 novel coronavirus pneumonia. They reported that cardiac injury was rare among light and mild patients, while common in severe and critical patients. They recommend monitoring heart function in COVID-2019 patients and applying potential interventions for those with abnormal cardiac injury related characteristics.
    Hui et al. (Feb 27, 2020). Clinical and radiographic features of cardiac injury in patients with 2019 novel coronavirus pneumonia. Pre-print downloaded Feb 27 from https://doi.org/10.1101/2020.02.24.20027052

- Fan et al. warn medical practitioners that COVID-19 may cause liver damage, so treatment with Lopinavir/ritonavir should be administered with caution.
    Fan et al. (Feb 27, 2020). Clinical Features of COVID-19 -Related Liver Damage. Pre-print downloaded Feb 27 from https://doi.org/10.1101/2020.02.26.20026971

- Tay et al. discuss the challenges of de-isolating COVID-19 suspect cases in Singapore. They report that no single indicator may be effectively used to decide on de-isolation of suspect cases. They provide criteria for de-isolation for COVID-19 suspect cases and conclude that a rigorous framework is required to help clinicians de-isolate COVID-19 patients safely.
    Tay et al. (Feb 26, 2020): De-isolating COVID-19 Suspect Cases: A Continuing Challenge. Clinical Infectious Diseases.
    https://academic.oup.com/cid/advance-article-abstract/doi/10.1093/cid/ciaa179/5758073

Public Health Policy and Practice
- The outbreak of COVID-19 placed unprecedented challenges on hospital environmental hygiene and medical staff's protection in Hospitals China. Jiang et al. assessed hospital environmental hygiene (air and surfaces) using quantitative real RT-PCR methods. Viruses were detected on surfaces in the isolation area with suspected patients and in the air of the isolation ward with an intensive care patient. They concluded comprehensive monitoring of hospital environmental hygiene during pandemic outbreaks is necessary for refining hospital infection control to protect medical staff.
    Jiang et al. (Feb 27, 2020). Clinical Data on Hospital Environmental Hygiene Monitoring and Medical Staffs Protection during the Coronavirus Disease 2019 Outbreak. Pre-print downloaded Feb 27 from https://doi.org/10.1101/2020.02.25.20028043

- Authors provide a detailed review of what is known and not known about SARS-CoV-19. They conclude that collaborative efforts of researchers are needed to fill the knowledge gaps about this new virus, to develop the proper diagnostic tools, and effective treatment to combat this infection. The need for rapid vaccine development and the potential of a plant system for biopharmaceutical development are discussed.
    Shanmugaraj et al. (Feb 22, 2020): Emergence of Novel Coronavirus 2019-nCoV: Need for Rapid Vaccine and Biologics Development. Pathogens. http://dx.doi.org/10.3390/pathogens9020148

Other Resources

- [Audio Interview: Preparing for the Spread of Covid-19](#) – New England Journal of Medicine