2019-nCoV Literature Situation Report (Lit Rep)
April 15, 2020

The scientific literature on COVID-19 is rapidly evolving and these articles were selected for review based on their relevance to Washington State decision making around COVID-19 response efforts. Included in these Lit Reps are some manuscripts that have been made available online as pre-prints but have not yet undergone peer review. Please be aware of this when reviewing articles included in the Lit Reps.

Key Takeaways

- **National BCG vaccination is correlated with protection from death from COVID-19, potentially due to non-specific "trained immunity" mediated by this vaccine.**
- **Homeless shelters in US could present high asymptomatic transmission rate of SARS-CoV-2.**
- **For the entire US, R0 declined from 4.02 to 1.51 between March 17 and April 1, 2020, implying the social distancing and other isolation measures put in place are working.**
- **AllTest® COV-19 IgG/IgM kit, which detects IgG and IgM antibodies, has high sensitivity but low specificity until 14 days after onset of clinical signs.**

Non-Pharmaceutical Interventions

- Green et al determine that BCG vaccination is correlated with protection from death from COVID-19. This correlation to new and existing studies and data suggest causal protective mechanisms that have been previously and rigorously demonstrated to be mediated by BCG vaccination. These mechanisms converge on "trained immunity," suggesting that this may be an important mechanism in individuals demonstrating protection from the lethal effects of COVID-19.

    Green et al. (April 15, 2020). COVID-19: A model correlating BCG vaccination to protection from mortality implicates trained immunity. Pre-print downloaded Apr 15 from https://www.medrxiv.org/content/10.1101/2020.04.10.20060905v1.full.pdf

Transmission

- Baggett et al describe rapid transmission of SARS-CoV-2 in homeless shelter in Boston, where 36% (147/408) inhabitants tested positive. Positive individuals were more likely to be male, but did not differ significantly from COVID-negative individuals with respect to other demographic and clinical characteristics. Signs like cough, shortness of breath, and fever were all uncommon among COVID-positive individuals. This report illustrates the rapidity with which COVID-19 can be widely transmitted without a clearly overt clinical disease episodes in a homeless shelter setting.

    Baggett et al. (April 15, 2020). COVID-19 outbreak at a large homeless shelter in Boston: Implications for universal testing. Pre-print downloaded Apr 15 from https://doi.org/10.1101/2020.04.12.20059618

- Jing et al. used a comprehensive contact-tracing dataset to estimate population-level effective RO and individual-level SAR in the household setting and to assess age effects on transmissibility and

infectivity of COVID-19 cases during the incubation period. They reported household SAR to be 13.8% between relatives within households and 19.3% in same residential address as the cases. Children (<20yrs) were 74% less likely to be infected compared to the elderly (≥ 60 yrs. old).

- A single COVID-19 case infected 0.48 close contacts within a household, increasing to 0.62 without isolation. They concluded that SARS-CoV-2 is more transmissible within households than SARS-CoV and MERS-CoV, and that the elderly are the most vulnerable. Case finding and isolation alone may be inadequate to contain the pandemic unless combined with restriction of human movement.
    Jing et al. (April 15, 2020). Household secondary attack rate of COVID-19 and associated determinants. Pre-print downloaded Apr 15 from https://doi.org/10.1101/2020.04.11.20056010.

- Gunzler and Sehgal calculated the current reproduction number (R0) for COVID-19 for each state in the United States. For the entire United States, they report that the time-varying R0 declined from 4.02 to 1.51 between March 17 and April 1, 2020, suggesting that social isolation measures may be having a beneficial effect.
    Gunzler and Sehgal (April 15 2020). Time-Varying COVID-19 Reproduction Number in the United States. Pre-print downloaded Apr 15 from https://doi.org/10.1101/2020.04.10.20060863.

Testing and Treatment

- Smith et al tested the feasibility of vaporized hydrogen peroxide (VHP), UV light, and ethanol decontamination strategies on N95 mask integrity and the ability to remove the infectious potential of SARS-CoV-2. VHP treated masks showed no significant change in function after two treatments, while UV light was not as effective and ethanol damaged the integrity of the masks. This data contributes to the evidenced-based decisions for disposable N95 mask reuse and helps protect caregivers from SARS-CoV-2 and other pathogens.
    Smith et al. (April 15, 2020). Effect of various decontamination procedures on disposable N95 mask integrity and SARS-CoV-2 infectivity. Pre-print downloaded Apr 15 from https://doi.org/10.1101/2020.04.11.20062331

- Garcia et al evaluated the diagnostic performance of AllTest[R] COV-19 IgG/IgM kit, which detects IgG and IgM antibodies. While the specificity was high (100%), sensitivity varied from 47.3% on day 1 to 88.9 - 91.1% on day 14. They concluded that for the IgG/IgM kit to be useful in hospitalized patients, the clinical history of 14 or more days from the onset of symptoms is necessary.
    Garcia et al. (April 15 2020). Rapid diagnosis of SARS-CoV-2 infection by detecting IgG and IgM antibodies with an immunochromatographic device: a prospective single-center study. Pre-print downloaded Apr 15 from https://doi.org/10.1101/2020.04.11.20062158

Clinical Characteristics and Health Care Setting

- A systematic review was conducted by Gajbhiye et al. on published articles on maternal and fetal outcomes in pregnant women with COVID-19 and the incidence of maternal-fetal transmission. Most common co-morbidities in women included diabetes, hypertensive disorders, and placental disorders, and in neonates included preterm birth, respiratory distress syndrome, pneumonia, and low birth weight (all above >10%). Vertical transmission rate of SARS-CoV-2 was also reported.
    Gajbhiye et al. (April 15, 2020). Pregnancy outcomes, Newborn complications and Maternal-Fetal Transmission of SARS-CoV-2 in women with COVID-19: A systematic review. Pre-print downloaded Apr 15 from https://doi.org/10.1101/2020.04.11.20062356

Modelling and Prediction

- Ramsey (2020) presents a simple theoretical well-mixed populations model for studying impact of social distancing on the spread of COVID -19. The model reports that epidemic growth rate is largely

determined by the upper interactivity quantiles of society, and suggests interaction capping approaches rather than overall reductions in interaction.

- In interactivity capping, the epidemic can be controlled without extreme sanctions on the majority of the population. He recommends use of robust testing, quarantining, and contact tracing to strengthen any social distancing measures, speed up eradication, and to prevent infection or reinfection.

  Ramsey (April 11 2020). Human agency and infection rates: implications for social distancing during epidemics. Pre-print downloaded Apr 15 from https://doi.org/10.1101/2020.04.11.20062042.

Public Health Policy and Practice

- Williams et al explored the perceptions and experiences of the UK public on social distancing and isolation measures against COVID-19 pandemic. They report that these measures had substantial negative impacts on the mental health and wellbeing of the public, especially those in low-paid or precarious employment. They recommend that it is necessary to mitigate the mental health impacts of COVID-19 as the support for and adherence to the policies are likely to wane over time, particularly where end dates are uncertain.

  Williams et al. (April 15 2020). Public perceptions and experiences of social distancing and social isolation during the COVID-19 pandemic: A UK-based focus group study. Preprint downloaded April 15 from https://doi.org/10.1101/2020.04.10.20061267

- Tahmasebi et al studied the correlations between twelve environmental, economic and health variables, and fatality rate of COVID-19 in 14 countries. Results indicate that diabetes prevalence and the proportion of aged population (>65+) in each country were correlated most strongly with the total number of deaths in them. This study highlights the importance of integrating regional specific variables in the modelling efforts aimed at projecting how the spread of the virus may influence different parts of the world.

  Tahmasebi et al. (April 15 2020). How do environmental, economic and health factors influence regional vulnerability to COVID-19? Preprint downloaded April 15 from https://doi.org/10.1101/2020.04.09.20059659.

Other Resources and Commentaries

- [Rapid prototyping and clinical testing of a reusable face shield for health care workers responding to the COVID-19 pandemic](#) – BMJ (preprint 2020)
- [Modifying reusable elastomeric respirators to utilise breathing system filters with 3D printed adapters, a safe alternative to N95 during COVID-19](#) – BMJ (Preprint 2020)
- [COVID-19: the case for health-care worker screening to prevent hospital transmission](#) – The Lancet (April 2020)
- [Pharmacologic Treatments for Coronavirus Disease 2019 (COVID-19): A Review](#) – JAMA Review (April 2020)
- [Drug Evaluation during the Covid-19 Pandemic: Perspective](#) - The New England Journal of Medicine (April 2020)