Dear DGH faculty and partners,

We are pleased to announce the release of this new daily newsletter that provides a succinct **summary of the latest scientific literature related to the COVID-19 pandemic**. Each day, there is a firehose of new scientific information emerging about COVID-19 and SARS-CoV-2. This initiative is an attempt to focus that hose to highlight new findings that are most relevant to the public health response. To that end, we will be providing a report that includes brief summaries of 10-15 articles that we judge to have the highest public health relevance, along with additional links to pertinent commentaries and other resources. Each citation will include a link to the original article. At this time, we are focused on the needs of public health professionals in Washington State, but we hope to expand coverage to address global needs for up-to-date information.

Each day, our team of University of Washington graduate students and faculty from the Schools of Public Health and Medicine conduct a systematic search of new references posted since the last report. Searches are conducted in PubMed and the pre-print databases medRxiv and bioRxiv. This results in approximately 400 to 1,000 search results each day. We then review all results for relevance and select the articles that we will include in the newsletter. The newsletter will be disseminated around 6:00pm Pacific time each day, Monday through Friday.

The project is currently being conducted by the UW MetaCenter for Pandemic Preparedness and Global Health Security and the START Center, in collaboration with and on behalf of the Washington State Department of Health. The report was originally developed and disseminated by the WA DOH COVID-19 Incident Management Team to support evidence-based decision making throughout the region.

If you would like to subscribe to receive this newsletter, please reply to this email with "Subscribe" in the subject line or email body.

Sincerely,

Brandon Guthrie, PhD
Departments of Global Health and Epidemiology

Jennifer Ross, MD MPH
Departments of Global Health and Medicine

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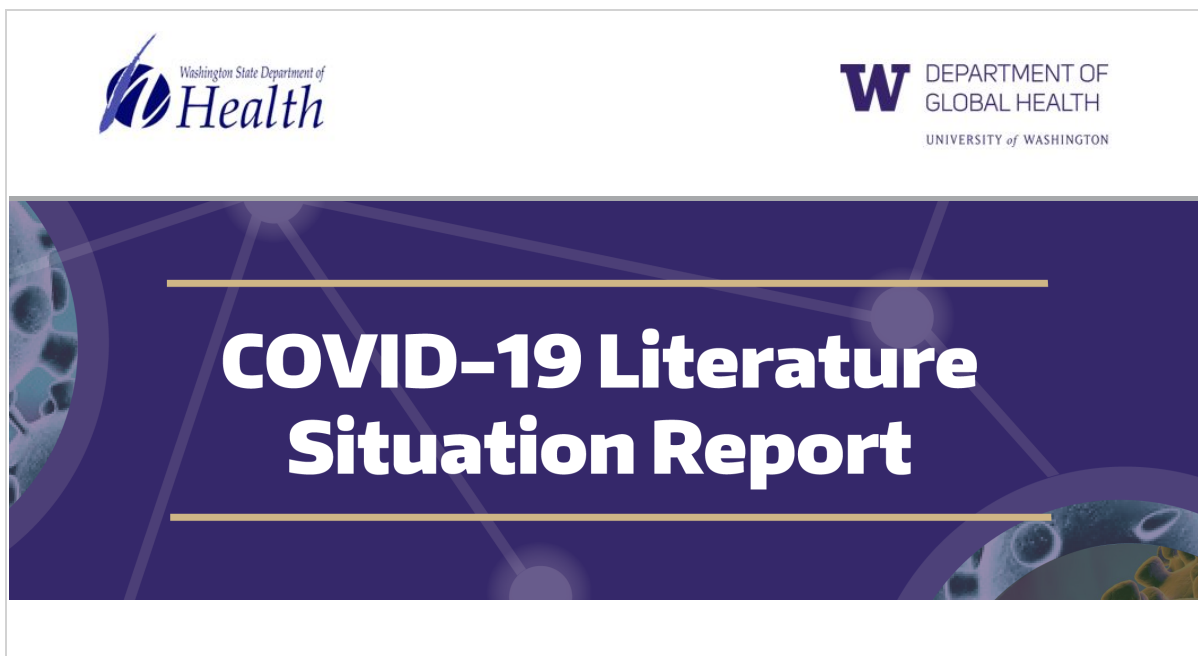
The scientific literature on COVID-19 is rapidly evolving and these articles were selected for review based on their relevance to decision-making around COVID-19 response efforts. Included in these Lit Reps are some manuscripts that have been made available online as pre-prints but have not yet undergone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

Today's summary is based on a review of 970 articles (837 published, 133 in preprint).

KEY TAKEAWAYS

- **There is no evidence that RAAS inhibitors increase the risk of severe COVID-19 disease. The authors recommend that these medications should not be discontinued in an attempt prevent severe cases of COVID-19.**
- **A lower proportion of pediatric patients with COVID-19 exhibit lymphopenia (9.8%) compared to adults, while children are more likely to have high levels of creatine kinase MB isoenzyme (27.0%), raising concerns about heart injury in pediatric patients.**
- **A simulation model shows the dominant mechanism of transmission of SARS-CoV-2 is through close contact, mostly directly but also mediated by fomites, while the contribution of the airborne route is negligible. Frequent hand washing and fomite cleaning coupled with avoiding physical contact result in a similar risk of infection as wearing gloves and a mask.**

TRANSMISSION

- Arav et al. developed an evidence-based mathematical model to identify the mechanism of how pre-symptomatic individuals transmit SARS-CoV-2. The model explicitly quantifies the dynamics of contact and airborne transmission between individuals indoors.
- Modeling results show the main transmission mechanism is through close contact, mostly directly but also mediated by fomites, while the contribution of the airborne route is negligible. Based in the model, frequent hand washing and fomite cleaning, coupled with avoiding physical contact, results in a similar risk for infection as wearing gloves and a mask.

Arav et al. (May 17, 2020). Understanding the Indoor Pre-Symptomatic Transmission Mechanism of COVID-19. Pre-print downloaded May 18 from https://doi.org/10.1101/2020.05.12.20099085

GEOGRAPHIC SPREAD

- Analyses of complete genome sequences of SARS-CoV-2 strains from around the world reveals increasing diversification of SARS-CoV-2 strains in three different genetic clades.
- The time of the most recent common ancestor was established to be around November 1, 2019, with a mean rate of evolution of 6.57 x 10-4 substitutions per site per year. High evolutionary rates and fast population growth characterizes the population dynamics of SARS-CoV-2 strains.

Castells et al. (May 15, 2020). Evidence of Increasing Diversification of Emerging SARS-CoV-2 Strains. Journal of Medical Virology. https://doi.org/10.1002/jmv.26018

TESTING AND TREATMENT

- Ejemel et al. identified a cross-reactive human IgA monoclonal antibody (MAb362) than can bind to both SARS-CoV and SARS-CoV-2 spike proteins and competitively block hACE2 receptor binding. It also neutralizes both pseudotyped SARS-CoV and SARS-CoV-2 in human epithelial cells expressing hACE2. MAb362 IgA may provide effective immunity against SARS-CoV-2 by inducing mucosal immunity within the respiratory system, a potentially critical feature of an effective vaccine.

Ejemel et al. (May 15, 2020). IgA MAb Blocks SARS-CoV-2 Spike-ACE2 Interaction Providing Mucosal Immunity. Pre-print downloaded May 18 from https://doi.org/10.1101/2020.05.15.096719

- A prediction model using COVID-19 data from the US up to March 31, 2020 indicates that early testing for SARS-CoV-2 with a large number of tests per capita is associated lower cumulative mortality in eighteen states.

Hittner et al. (May 16, 2020). Early and Massive Testing Saves Lives COVID-19: Related Infections and Deaths in the United States during March of 2020. Pre-print downloaded May 18 from https://doi.org/10.1101/2020.05.14.20102483

- African green monkeys can be used as an animal mode for SARS-CoV-2 infection. African green monkeys experience high levels of SARS-CoV-2 replication and develop pronounced respiratory disease following a much lower and more natural dose of SARS-CoV-2 than has been employed in other non-human primate studies. The heterologous response of African green monkeys along with the ability to collect tissues and longitudinal samples permits a detailed study of pathogenesis and host immunity to COVID-19.

Woolsey et al. (May 17, 2020). Establishment of an African Green Monkey Model for COVID-19. Pre-print downloaded May 18 from https://doi.org/10.1101/2020.05.17.100289

◤ CLINICAL CHARACTERISTICS AND HEALTH CARE SETTING

- Among a cohort of 2,597 pediatric patients with COVID-19, a low proportion exhibited lymphopenia (9.8%) compared to adults. Elevated creatine kinase MB isoenzyme was much more commonly observed in children (27%) than that in adults, raising some concerns about heart injury in pediatric patients.

Cui et al. (May 17, 2020). Children with Coronavirus Disease 2019 (COVID-19): A Review of Demographic, Clinical, Laboratory and Imaging Features in 2,597 Pediatric Patients. Journal of Medical Virology. https://doi.org/10.1002/jmv.26023

- Despite earlier concerns, de Abajo et al. found no evidence that RAAS inhibitors increase the risk of COVID-19 requiring admission to hospital, including fatal cases and those admitted to ICUs. The authors conducted a case-population study in Madrid, Spain including 1,139 patients and controls matched for age, sex, region, and date of admission to hospital at a ratio of 10:1. They recommend that RAAS inhibitors should not be discontinued in an attempt to prevent severe cases of COVID-19.

de Abajo et al. (May 14, 2020). Use of Renin-Angiotensin-Aldosterone System Inhibitors and Risk of COVID-19 Requiring Admission to Hospital: A Case-Population Study. Lancet. https://doi.org/10.1016/S0140-6736(20)31030-8

◤ Modeling and Prediction

- Albi et al. used an SIR-type compartmental model with a social structure modified with appropriate feedback controls to assess the impact of a selective relaxation of the containment measures in relation to the resumption of SARS-CoV-2 spread.
- This model generates simulations that are in agreement with the current epidemic scenarios in countries including Germany, France, Italy, Spain, the United Kingdom and the United States. The inclusion of uncertainty about the actual value of the number of infected people makes it possible to analyze the effects of the potential reopening of productive and social activities at different times.
- The model suggests that countries such as the US that are still in an epidemic situation should maintain lockdown measures before moving to a second phase while countries such as German could gradually reopen social and economic activities while maintaining epidemic control.

Albi et al. (May 16, 2020). Relaxing Lockdown Measures in Epidemic Outbreaks Using Selective Socio-Economic Containment with Uncertainty. Pre-print downloaded May 18 from https://doi.org/10.1101/2020.05.12.20099721

- The COVID-19 Agent-based Simulator (Covasim), which has been applied world-wide to examine disease dynamics and policy options, can be used to project epidemic trends, explore intervention scenarios, and estimate resource needs in the pandemic COVID-19.
- Covasim accounts for demographic information, realistic transmission networks in different social layers, age-specific disease outcomes, and intrahost viral dynamics. It also supports an extensive set of non-pharmaceutical interventions and testing interventions, which can incorporate the effects of delays, loss-to-follow-up, micro-targeting and other factors.

Kerr et al. (May 15, 2020). Covasim an Agent-Based Model of COVID-19 Dynamics and Interventions. Pre-print downloaded May 18 from https://doi.org/10.1101/2020.05.10.20097469

- Zhang implemented SIR models to determine the earliest time of a multi-phased release of the population from lockdown restrictions for two states, Illinois and New York, constrained by a specified threshold on the subsequent peaks of infection.
- If the population under lockdown is to be released in equal sized batches, then it is prudent to wait for a substantial decrease in "active infections." If the population under lockdown is to be released at a steady rate, then that release rate should be quite low. An adaptive gradual release policy with a variable rate results in maintaining reduction in active infected cases and provides a relatively fast release of the population from lockdown.

Zhang. (May 15, 2020). Strategic Release of Lockdowns in a COVID Infection Model. Pre-print downloaded May 18 from https://doi.org/10.1101/2020.05.10.20096446

Public Health Policy and Practice

- Perrotta et al. present information about attitudes and behaviors related to COVID-19 from a rapid response monitoring system that recruited participants via targeted Facebook advertisement campaigns from March 13-April 19, 2020 across eight countries.
- Women expressed a higher perception of threat and lower confidence in the health system. Women were also more likely to adopt preventive behaviors.
- Older people demonstrated a higher level of awareness and concern about COVID-19, in line with the evidence that the elderly are at highest risk of severe complications following infection from COVID-19.

- Substantial temporal and spatial heterogeneity exists in terms of confidence in institutions and responses to non-pharmaceutical interventions.

Perrotta et al. (May 15, 2020). Behaviors and Attitudes in Response to the COVID-19 Pandemic Insights from a Cross-National Facebook Survey. Pre-print downloaded May 18 from https://doi.org/10.1101/2020.05.09.20096388

◥ OTHER RESOURCES AND COMMENTARIES

- [Dogs caught coronavirus from their owners, genetic analysis suggests](#) – Nature (May 14)
- [15 drugs being tested to treat COVID-19 and how they would work](#) – Nature Medicine (May 15)
- [Wrong but Useful - What Covid-19 Epidemiologic Models Can and Cannot Tell Us](#) – NEJM (May 15)
- [Reopening Society and the Need for Real-Time Assessment of COVID-19 at the Community Level](#) – JAMA (May 15
- [Skin manifestations of COVID-19 – Cleveland Clinic Journal of Medicine](#) (May 14)
- [COVID-19 Research in Brief: 9 May to 15 May, 2020](#) – Nature Medicine (May 15)
- [COVID-19 infection also occurs in patients taking hydroxychloroquine](#) – Journal of Antimicrobial Chemotherapy (May 17)
- [Antibody Testing For Covid-19: Can It Be Used As A Screening Tool In Areas With Low Prevalence](#) – American Journal of Clinical Pathology (May 15)

The COVID-19 Lit Rep is currently prepared by the UW MetaCenter for Pandemic Preparedness and Global Health Security and the START Center in collaboration with and on behalf of the Washington State Department of Health. The Lit Rep was originally developed and disseminated by the WA DOH COVID-19 Incident Management Team to support evidence-based decision making throughout the region.