



2019-nCoV Literature Situation Report (Lit Rep)

April 24, 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

- 📄 **The downward trend of IgG during recovery may indicate limited duration of acquired immune protection**
- 📄 **A report on the prevalence of SARS-CoV-2 infection in previously undiagnosed U.S. healthcare workers in the early phase of the U.S. COVID-19 epidemic attributes 7% prevalence to close contact with patients.**
- 📄 **Results from a systematic review suggest that: (1) social distancing is effective but costly, especially when adopted late and (2) adopting as early as possible a combination of interventions that includes hand washing, face masks, swift contact tracing and case isolation and PPE for healthcare workers is the most cost effective.**

Testing and Treatment

- This ecologic modeling study compares the dynamics of COVID-19 daily deaths in countries using anti-malaria drugs as a treatment from the start of the epidemic versus countries that do not. The authors report major differences in death rates, with countries using or producing chloroquine or hydroxychloroquine on a massive scale faring better than those which do not.
- The authors note that there could be systematic differences between the two groups, such as testing strategies or political structure that could account for the difference in death rates.
Izoulet (Apr 24, 2020). National Consumption of Antimalarial Drugs and COVID-19 Deaths Dynamics: An Ecological Study. Pre-print downloaded Apr 24 from <https://doi.org/10.1101/2020.04.18.20063875>
- Hu et al report on the production of specific IgM and IgG antibodies among 221 confirmed COVID-19 patients, among which were 181 mild and moderate cases and 40 severe cases. The study records the concentration peak of SARS-CoV-2 IgM and IgG antibodies every 3 days post symptom onset and finds that, that although antibody testing on day 16-21 is associated with increased detection rates, the antibody concentration did not affect the course and outcome of the infection. The downward trend of IgG during recovery may indicate its limited duration of protection, a concern seeming to suggest inadequate protective immunity after recovery from infection
Hu et al. (Apr 23, 2020). The production and clinical implications of SARS-CoV-2 antibodies. Pre-print downloaded Apr 24 from <https://doi.org/10.1101/2020.04.20.20065953>

Clinical Characteristics and Health Care Setting

- This easy-to-use point-based algorithm, called the corona-score, uses laboratory parameters, demographic data and the chest X-ray/CT of patients to rapidly evaluate an individual's risk of SARS-CoV-2 infection at the emergency department (ED).
- The algorithm has a sensitivity of 95% and specificity of 96%, and could have important utility in EDs experiencing a shortage of RT-PCR testing materials.

Kurstjens et al. (Apr 24, 2020). Rapid identification of SARS-CoV-2-infected patients at the emergency department using routine testing. Pre-print downloaded Apr 24 from <https://doi.org/10.1101/2020.04.20.20067512>

- Barrett et al report on the prevalence of SARS-CoV-2 infection in previously undiagnosed U.S. healthcare workers in the early phase of the U.S. COVID-19 epidemic. They report a prevalence of 7.3 and 0.4% SARS-CoV-2 infection in healthcare and non-healthcare workers, respectively. They attribute the 7.0% greater absolute risk to high levels of close patient contact by healthcare workers and call for additional strategies to protect these critical frontline workers.

Barrett et al. (Apr 24, 2020). Prevalence of SARS-CoV-2 infection in previously undiagnosed health care workers at the onset of the U.S. COVID-19 epidemic. Pre-print downloaded Apr 24 from <https://doi.org/10.1101/2020.04.20.20072470>

Mental Health and Personal Impact

- This study investigated how the geographical distance of working adults to the epicenter of Wuhan predicts their burnout - emotional, physical and mental exhaustion due to excessive and prolonged stress. The results showed that working adults' distance to the epicenter of Wuhan had an inverted U-shaped relationship with their burnout. This study may be useful to mental healthcare practitioners and policymakers to identify regions where people may need psychiatric assistance the most during pandemic outbreak.

*Zhang et al. (Apr 14, 2020). Geographical distance to the epicenter of Covid-19 predicts the burnout of the working population: Ripple effect or typhoon eye effect? *Psychiatry Research*. <https://doi.org/10.1016/j.psychres.2020.112998>*

Modelling and Prediction

- Juneau et al provide a comprehensive summary of the evidence on SARS-CoV-19 epidemic control, with a focus on cost-effectiveness. They report on higher-quality evidence from studies that support the cost effectiveness of hand washing and face masks. For COVID-19: (1) social distancing is effective but costly, especially when adopted late and (2) adopting as early as possible a combination of interventions that includes hand washing, face masks, swift contact tracing and case isolation, and protective equipment for healthcare workers is likely to be the most cost-effective strategy

Juneau et al. (Apr 24, 2020). Evidence-based, cost-effective interventions to suppress the COVID-19 pandemic: a rapid systematic review. Pre-print downloaded Apr 24 from <https://doi.org/10.1101/2020.04.20.20054726>

- The authors analyzed the dynamics of new SARS-CoV-2 infection and death cases to estimate the daily reproduction numbers (R_t) and the effectiveness of control measures in the most affected European Countries and the US. They report that calculating R_t based on both the daily number of infections and deaths provides a more reliable estimates than those based on infection cases alone. Death based R_t estimates are less susceptible to testing bias or limited capacities.

Ensser et al. (Apr 24, 2020). Modest effects of contact reduction measures on the reproduction number of SARS-CoV-2 in 2 the most affected European countries and the US. Pre-print downloaded Apr 24 from <https://doi.org/10.1101/2020.04.20.20067538>

- Bartsch et al developed a Monte Carlo simulation model to estimate the burden COVID-19 will impose on the US health care system. The model represented the U.S. population and what could happen to each person who gets infected with SARS-CoV-2, predicting that a single symptomatic COVID-19 infection would cost a median of \$3,045 in direct medical costs during the course of the infection. Predictions for hospitalizations, ICU admissions, ventilators used and hospital bed days and direct costs are provided for different hypothetical prevalence rates in the US.

Bartsch et al. (Apr 23, 2020). The potential health care costs and resource use associated with COVID-19 in the United States. *Health Affairs*. <https://doi.org/10.1377/hlthaff.2020.00426>

Public Health Policy and Practice

- This article describes how to modify existing, or create custom light fixtures compatible with common UV-C bulbs to sterilize N95 masks. This system is scalable and can be created for less than 50 US dollars, on site, at the point of need, and leverages resources that are currently untapped and sitting unused in public and private research facilities.

Gilbert et al. (April 24 2020). Healthcare worker mask reuse in a global pandemic: Using idle resources to create an inexpensive, scalable, and accessible UV system for N95 sterilization. Pre-print downloaded April 24 from <https://doi.org/10.1101/2020.04.19.20070870>.

- This article provides a roadmap instructing how a research institute can be repurposed in the midst of this crisis, in collaboration with partner hospitals and an established diagnostic laboratory. Existing expertise in virus handling, robotics, PCR and data science can be harnessed to create a rapid, high throughput diagnostic pipeline for detecting SARS-CoV-2 in patients with suspected COVID-19.
- This strategy facilitates the remote reporting of thousands of samples a day with a turnaround time of under 24 hours and is universally applicable to laboratories worldwide.

Aitken et al. (April 24 2020). Scalable and Resilient SARS-CoV2 testing in an Academic Centre. Pre-print downloaded April 24 from <https://doi.org/10.1101/2020.04.19.20071373>

- The COVID-19 outbreak has required healthcare institutions to rapidly adapt to changing public health circumstances, including switching to novel healthcare delivery modes such as use of chatbots to offer digital health and telehealth services. Chatbots are one digital health tool that can help evolve triage and screening processes in a scalable manner. Espinoza et al present a decision-making and implementation framework for deploying COVID-19 screening chatbots at pediatric healthcare facilities.

Ezpinoza et al. (Apr 23, 2020). A guide to chatbots for COVID-19 screening at pediatric healthcare facilities. *JMIR*. <https://publichealth.jmir.org/preprint/18808>

Other Resources and Commentaries

- [Self-reported symptoms of covid-19 including symptoms most predictive of SARS-CoV-2 infection, are heritable](#) – medRxiv preprint (Apr 24)
- [How should we treat pregnant women infected with SARS-CoV-2?](#) –BJOG (Apr 23)
- [Synopsis: Coronavirus Disease Outbreak in Call Center, South Korea](#) – CDC Emerg Infect Dis (Apr 23)
- [Travel restrictions hampering COVID-19 response](#) – Lancet (Apr 2020)