



2019-nCoV Literature Situation Report (Lit Rep)

May 27, 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

- **Salivary antibodies to SARS-CoV-2 mirror serum antibody responses, indicating that oral antibody testing could be a non-invasive alternative to serological testing to enable widespread monitoring of SARS-CoV-2 infection throughout the population.**
- **An agent-based model produced by the Institute for Disease Modeling (IDM) predicts a robust program of testing, household quarantine, and contact tracing will be required to balance the increase in disease transmission associated with relaxing physical distancing in King County, WA.**
- **Americans in states with facemask mandates spend less time at home and make an increased number of visits to commercial locations after their state's mandate takes effect. The impact of this increased mobility on transmission will depend on the effectiveness of masks to prevent transmission and the impact that mask wearing has on behaviors associated with transmission.**
- **Online COVID-19 symptom checkers and chatbots are being widely used in response to the pandemic. However, online symptom checkers vary widely in their predictive capabilities, suggesting that quality assessment of these tools is needed prior to implementation.**

Non-Pharmaceutical Interventions

- *[pre-print, not peer reviewed]* Rosenfeld et al. use a new model (Covasim) to simulate population-level SARS-CoV-2 transmission expected with reopening and the extent to which measures including testing, tracing, and quarantine can prevent exponential growth in King County, WA.
- Distancing and other measures have reduced the transmission potential of COVID-19 on April 25th to 33% (30-37%) of early-pandemic levels. Increased testing, contact tracing to home and work, and better compliance with household quarantine beginning on May 26th could counterbalance a two-fold increase in work and community transmission from the level estimated on April 25th.
Rosenfeld et al. (May 25, 2020). Modeling Countermeasures for a Balanced Reopening in King County, Washington. IDM. Report downloaded May 27 from https://covid.idmod.org/data/Modeling_countermeasures_for_balanced_reopening_King_County_Washington.pdf
- *[pre-print, not peer reviewed]* Statewide stay-at-home policies induced "mandate effects" of 4.1%-5.9% declines in travel and visits to non-essential businesses relative to pre-COVID-19 levels for the first four states to introduce such policies (CA, IL, NJ, NY).
- By the time of statewide stay-at-home mandates in many states, residents had already reduced travel by considerable amounts relative to pre-COVID-19 levels.

- A 1% reduction in visits to non-essential businesses is associated with 9.2 fewer deaths per 100 million per day. This corresponds to 74,000 lives saved nationwide and an economic benefit of \$249-\$745 billion from deaths averted by observed behavioral changes in March and April.
Sears et al. (May 26, 2020). Are We #stayinghome to Flatten the Curve. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.23.20111211>
- [pre-print, not peer reviewed] Yan et al. use SafeGraph smart device location data and show that the representative American in states that have facemask mandates spends 20-30 minutes less time at home and makes an increased number of visits to commercial locations following the mandate. The authors suggest that this is due to substitution behavior and could lead to a resurgence of cases.
Yan et al. (May 27, 2020). Do Face Masks Create a False Sense of Security A COVID-19 Dilemma. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.23.20111302>

Transmission

- [pre-print, not peer reviewed] SARS-CoV-2 RNA was detectable in blood samples at low viral loads up to 20 days after symptom onset in 27 of 212 (12.7%) COVID-19 cases. However, there was no evidence of infectious SARS-CoV-2 based on inoculating PCR-positive sera into cell culture.
Andersson et al. (May 26, 2020). SARS-CoV-2 RNA Detected in Blood Samples from Patients with COVID-19 Is Not Associated with Infectious Virus. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.21.20105486>
- Jin et al. found that among SARS-CoV-2 infection cases (n=89), serum IgM was significantly higher among those with prolonged viral RNA shedding (>30 days) at weeks 4 and 5 after symptom onset, IgM levels were similar between prolonged and non-prolonged shedders from weeks 6 to 8, and declined almost to the reference level in both groups at week 8.
- Serum IgM persisted at a high level during the acute illness and up to 8 weeks after symptom onset.
Jin et al. (May 18, 2020). Correlation between viral RNA shedding and serum antibodies in COVID-19 patients. Clinical Microbiology and Infection. <https://doi.org/10.1016/j.cmi.2020.05.022>
- [pre-print, not peer reviewed] Takenouchi et al used whole viral genome sequencing to determine that 9 COVID-19 patients at a tertiary medical center had probable community infection instead of being associated with infection clusters at the medical center.
Takenouchi et al. (May 26, 2020). Clinical Utility of SARS-CoV-2 Whole Genome Sequencing in Deciphering Source of Infection. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.21.20107599>

Testing and Treatment

- [pre-print, not peer reviewed] Gan et al. diluted three SARS-CoV-2 positive samples (2 with high viral load and 1 with low viral load) with 8,094 negative samples or double distilled water to form RNA pools. SARS-CoV-2 was detected in pools from high viral load samples up to 1/1000 dilution, while the low viral load sample could only be observed at a low dilution ratio. Based on these findings, pooling samples for surveillance may lead to false negatives for samples with low viral load.
Gan et al. (May 26, 2020). Sample Pooling as a Strategy of SARS-COV-2 Nucleic Acid Screening Increases the False-Negative Rate. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.18.20106138>

- *[pre-print, not peer reviewed]* Randad et al. evaluated the correlation of results obtained in 167 saliva samples vs. 324 serum samples and found that SARS-CoV-2 appears to trigger a humoral immune response resulting in the almost simultaneous rise of IgG, IgM and IgA levels in serum and in saliva, consistent with the stimulation of existing cross-reactive B cells.
- SARS-CoV-2 antibody testing in saliva may play a role in large-scale sero-surveillance for COVID-19. *Randad et al. (May 26, 2020). COVID-19 Serology at Population Scale SARS-CoV-2-Specific Antibody Responses in Saliva. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.24.20112300>*
- Zhang et al. report the efficacy of therapeutic plasma exchange (TPE) in three severe COVID-19 patients with acute respiratory distress syndrome in China. Approximately 10 days after TPE, all three patients had met discharge criteria. The results suggested TPE might be a possible strategy to attenuate circulating cytokines and inflammatory mediators. *Zhang et al. (May 26, 2020). Efficacy of therapeutic plasma exchange in severe COVID-19 patients. British Journal of Haematology. <https://doi.org/10.1111/bjh.16890>*

Clinical Characteristics and Health Care Setting

- *[pre-print, not peer reviewed]* Lee et al. evaluated the effect of cancer-related treatments on the risk for COVID-19 among >1.8 million patients living with cancer in the UK, US and Sweden. They found that individuals with cancer had a significantly increased risk (aOR 1.62, 95%CI 1.37-1.91) of COVID-19 compared to the general community. Those treated with chemotherapy or immunotherapy were particularly at risk (aOR: 2.42; 95%CI: 1.81-3.25). *Lee et al. (May 26, 2020). Cancer and Risk of COVID-19 through a General Community Survey. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.20.20103762>*

Modeling and Prediction

- *[pre-print, not peer reviewed]* Kohanovski et al. applied an SEIR model to infer the effective start dates of non-pharmaceutical interventions and found that they often differ from the official dates. They hypothesize that late effects may be due to low compliance or prolonged time to adopt and organize for a lockdown. Early effects may be due to early adoption of social distancing and similar behavioral adaptations. These results highlight the complex interaction between personal, regional, and global determinants of behavioral response to an epidemic. *Kohanovski et al. (May 26, 2020). Inferring the Effective Start Dates of Non-Pharmaceutical Interventions during COVID-19 Outbreaks. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.24.20092817>*
- *[pre-print, not peer reviewed]* Neil et al. use a Bayesian technique called "virtual evidence" to test the sensitivity of the infection fatality rate (IFR) to two significant sources of uncertainty: survey quality and COVID-19 death counts. This approach estimates an IFR that is higher than widely reported values. For Santa Clara, CA and Chelsea, MA, the most likely IFR values are 0.3-0.4%. *Neil et al. (May 26, 2020). Bayesian Network Analysis of Covid-19 Data Reveals Higher Infection Prevalence Rates and Lower Fatality Rates than Widely Reported. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.25.20112466>*

Public Health Policy and Practice

- In 4 states with stay-at-home orders (CO, MN, OH, and VA), cumulative hospitalizations for COVID-19 deviated from projected exponential growth rates after these orders became effective. The deviation started 2 to 4 days sooner than the median effective date of each state's order and may reflect the use of a median incubation period for symptom onset and time to hospitalization to establish this date. Factors that potentially decreased the hospitalization include school closures, social distancing guidelines, and general pandemic awareness.
Sen et al. (May 27, 2020). Association of Stay-at-Home Orders With COVID-19 Hospitalizations in 4 States. JAMA. <https://doi.org/10.1001/jama.2020.9176>
- [pre-print, not peer reviewed] Online COVID-19 symptom checkers and chatbots are being widely used in response to the global pandemic. Munsch et al. evaluated 10 online COVID-19 symptom checkers using COVID-19 case reports and found them to vary widely in their predictive capabilities, suggesting that quality assessment of these tools is necessary before they are implemented.
Munsch et al. (May 26, 2020). A Benchmark of Online COVID-19 Symptom Checkers. Pre-print downloaded May 27 from <https://doi.org/10.1101/2020.05.22.20109777>

Other Resources and Commentaries

- [Racial Disparities in COVID-19 Deaths Reveal Harsh Truths About Structural Inequality in America](#) - Journal of Internal Medicine (May 25)
- [Vulnerable Immigrant Populations in the New York Metropolitan Area and COVID-19: Lessons Learned in the Epicenter of the Crisis](#) – Academic Medicine (May 22)
- [Prevalence of SARS-CoV-2 Among Patients Admitted for Childbirth in Southern Connecticut](#) – JAMA (May 26)
- [Emerging Lessons From COVID-19 Response in New York City](#) – JAMA (May 26)
- [Children are protected against SARS-CoV-2 infection](#) – Journal of Clinical Virology (May 15)
- [Human neutralizing antibodies elicited by SARS-CoV-2 infection](#) – Nature (May 26)
- [Inappropriate Nasopharyngeal Sampling for SARS-CoV-2 Detection Is a Relevant Cause of False-Negative Reports](#) – Otolaryngology–Head and Neck Surgery (May 13)
- [More on Neurologic Features in Severe SARS-CoV-2 Infection](#) – NEJM (May 26)
- [A human neutralizing antibody targets the receptor binding site of SARS-CoV-2](#) – Nature (May 26)
- [No Benefit for Lopinavir-Ritonavir in Severe COVID-19](#) – JAMA (May 26)
- [Investigating the genomic landscape of novel coronavirus \(2019-nCoV\) to identify non-synonymous mutations for use in diagnosis and drug design](#) – Journal of Clinical Virology (May 15)
- [Adverse Consequences of Rushing a SARS-CoV-2 Vaccine: Implications for Public Trust](#) – JAMA (May 26)
- [Study on the expression levels of antibodies against SARS-CoV-2 at different period of disease and its related factors in 192 cases of COVID-19 patients](#) – Preprint (May 26)

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