2019-nCoV Literature Situation Report (Lit Rep)

July 6, 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

- **A meta-analysis of 10 studies (9,890 subjects) found no significant association between using ACE inhibitors or angiotensin receptor blockers and the risk of severe or lethal COVID-19.** More
- **A meta-analysis and bias assessment of serological tests for COVID-19 reported a low pooled sensitivity of lateral flow immunoassays of 66% and a pooled specificity of 97%, which could limit the application of this approach as a point-of-care method.** More
- **Aggregated cell phone data showed decreased mobility patterns relative to the periods before COVID-19 among 25 counties in the US and a high correlation between decreased mobility and reduced COVID-19 case growth rates.** More
- **Approximately two-thirds of the 938 residents and staff tested for SARS-CoV-2 at 9 long-term care facilities in California tested positive.** More

Non-Pharmaceutical Interventions

- Across 25 US counties with high COVID-19 case numbers from January 1 to April 20, 2020, aggregated cell phone data was used to define a mobility ratio (MR) as the change in the number of individual trips made per day, relative to ordinary behavioral patterns before COVID-19.
- The MR varied from 0.35 in New York City to 0.63 in Harris County, TX. There was a high correlation (>0.7) between decreased mobility and reduced case growth rates in 20 of 25 counties.

  Badr et al. (July 1, 2020). Association between Mobility Patterns and COVID-19 Transmission in the USA: A Mathematical Modelling Study. The Lancet Infectious Diseases. https://doi.org/10.1016/S1473-3099(20)30553-3

- Measures used in Taiwan to successfully control the spread SARS-CoV-2 in colleges and universities could inform such re-openings elsewhere. The Ministry of Education in Taiwan established general guidelines for college campuses that include creation of a task force at each university, school-based risk screening based on travel history, occupation, contacts, and clusters, self-management of health and quarantine, general hygiene measures (including wearing masks indoors), principles on ventilation and sanitization, regulations on school assemblies, a process for reporting suspected cases, and policies on school closing and make-up classes.

  Cheng et al. (July 2020). How to Safely Reopen Colleges and Universities During COVID-19: Experiences From Taiwan. Annals of Internal Medicine. https://doi.org/10.7326/M20-2927

Transmission

- Hogan et al. retrospectively tested 1,700 nasopharyngeal swab samples from persons with respiratory signs/symptoms seen at Stanford Health Care, Palo Alto, California, USA, during October 31, 2019–December 31, 2019. They found no evidence that SARS-CoV-2 infections occurred earlier than was previously recognized.

  Hogan et al. (July 3, 2020). Retrospective Screening for SARS-CoV-2 RNA in California, USA, Late 2019. Emerging Infectious Diseases. https://doi.org/10.3201/eid2610.202296

- Li et al. conducted a rapid review of 16 studies investigating the role of children in the transmission of SARS-CoV-2. Two studies reported transmission of SARS-CoV-2 from infected children (1 with a 3-month-old whose parents developed symptomatic COVID-19 seven days after caring for the infant; 1 with two children who may have contracted COVID-19 from the initial cases at a school in New South Wales). Six studies presented indirect evidence of the potential for SARS-CoV-2 transmission by children, 3 of which found prolonged virus shedding in stool. Two studies reported outbreaks of COVID-19 in school settings. One study was a case report of a child attending classes that did not result in infecting any other pupils or staff.
- The authors conclude that evidence is limited and further seroprevalence studies are needed to establish whether children are less frequently infected or less infectious than adults.

  Li et al. (June 29, 2020). The Role of Children in Transmission of SARS-CoV-2: A Rapid Review. Journal of Global Health. https://doi.org/10.7189/jogh.10.011101

Testing and Treatment

- Flacco et al. conducted a meta-analysis (10 studies including 9,890 subjects) to estimate the association between hypertensive medication and COVID-19 outcomes. Results showed that, compared to untreated subjects, treatment with ACE inhibitors or angiotensin receptor blockers (ARBs) was not associated with the risk of severe or lethal COVID-19 (OR=0.90, 95%CI 0.65-1.26 for ACE inhibitors; OR=0.92, 95%CI 0.75-1.12 for ARBs). Treatment with both drugs was not associated with risk of death from COVID-19 (OR=0.88, 95%CI 0.68-1.14).
- The authors recommend the continuation of ARBs or ACE inhibitors for all patients, unless otherwise advised by their physicians.

  Flacco et al. (July 1, 2020). Treatment with ACE Inhibitors or ARBs and Risk of Severe/Lethal COVID-19: A Meta-Analysis. Heart. https://doi.org/10.1136/heartjnl-2020-317336

- The diagnostic accuracy of serological tests for SARS-CoV-2 antibodies was reviewed by Lisboa Bastos et al. based on 40 studies and 49 bias assessments. They found a high risk of patient selection bias in 98% (48/49) of assessments and high or unclear risk of bias regarding performance or interpretation of the serological test in 73% (36/49).
- The pooled sensitivity of ELISAs was 84.3% (95%CI 75.6-90.9%), of lateral flow immunoassays was 66.0% (49.3-79.3%), and of chemiluminescent immunoassays was 97.8% (46.2-100%). Sensitivity was higher at least three weeks after symptom onset (range 69.9-98.9%) compared with within the first week (range 13.4-50.3%). Among lateral flow assays, pooled sensitivity of commercial kits (65.0%, 49.0-78.2%) was lower than that of non-commercial tests (88.2%, 83.6-91.3%). Pooled specificities ranged from 96.6% to 99.7%, with a pooled specificity for lateral flow tests of 96.6-97.6%.

- The authors raised concerns about further use of existing point-of-care serological tests based on their limited sensitivity.

  Lisboa Bastos et al. (July 1, 2020). Diagnostic Accuracy of Serological Tests for Covid-19: Systematic Review and Meta-Analysis. BMJ (Clinical Research Ed.). https://doi.org/10.1136/bmj.m2516

Clinical Characteristics and Health Care Setting

- A high prevalence of SARS-CoV-2 infection was identified in long-term care facilities in Pasadena, California. Among 938 persons (356 staff and 582 residents) tested for SARS-CoV-2 using rRT-PCR at 9 long-term care facilities, 631 were positive (overall: 67%; staff: 63%; residents: 70%). Staff involved with direct patient care had a higher rate of infection than staff who were not (69%,150/219 vs. 48%, 25/52). Among 631 who tested positive, 257 were asymptomatic (overall 41%; staff: 25%; residents: 50%). Female residents had a higher rate of asymptomatic infection than male residents (51%, 121/237 vs. 47%, 81/171).

  Feaster and Goh. (July 2, 2020). High Proportion of Asymptomatic SARS-CoV-2 Infections in 9 Long-Term Care Facilities, Pasadena, California, USA, April 2020. Emerging Infectious Diseases. https://doi.org/10.3201/eid2610.202694

Modeling and Prediction

- *[Preprint, not peer-reviewed]* An SEIR model for the COVID-19 epidemic that incorporates time-varying impacts of non-pharmaceutical interventions in Los Angeles and Santa Clara County, Seattle, Miami, and Atlanta shows that the first-wave interventions in mid-March, 2020 of eliminating large social gatherings, mandated mask-wearing and physical distancing have affected the heterogeneity in transmission rates by eliminating high-risk events.

  Kain et al. (July 3, 2020). Chopping the Tail: How Preventing Superspreading Can Help to Maintain COVID-19 Control. Pre-print downloaded July 6 from https://doi.org/10.1101/2020.06.30.20143115

- Tsay et al. reported a novel, optimization-based decision-making framework for managing the COVID-19 outbreak in the US. This includes modeling the dynamics of affected populations, estimating the model parameters and hidden states from data, and an optimal control strategy for sequencing social distancing and testing events such that the number of infections is minimized.
- Results show that social distancing and quarantining are most effective when implemented early, with quarantining of confirmed infected subjects having a much higher impact. The "on-off" policies alternating between strict social distancing and relaxing such restrictions can be effective at "flattening" the curve while likely minimizing social and economic cost.

  Tsay et al. (July 1, 2020). Modeling, State Estimation, and Optimal Control for the US COVID-19 Outbreak. Scientific Reports. https://doi.org/10.1038/s41598-020-67459-8

Public Health Policy and Practice

- *[Preprint, not peer-reviewed]* Tomsich et al. conducted a cross-sectional time series study to estimate changes in firearm purchasing and relationships with interpersonal firearm violence in the US during the COVID-19 pandemic. They estimate 2.1 million excess firearm purchases between March-May 2020, representing a 64% increase over the expected volume. The estimated relative

rate of death and injury from firearm violence was 1.015 (95%CI 1.005-1.025) for every 100 excess purchases per 100,000, adjusting for variation in purchasing across states.

Tomsich et al. (July 4, 2020). Firearm Purchasing and Firearm Violence in the First Months of the Coronavirus Pandemic in the United States. Pre-print downloaded July 6 from https://doi.org/10.1101/2020.07.02.20145508

- Geana conducted an online survey among 131 Kansans during the COVID-19 pandemic and found that participants had good knowledge about the disease and preventive measures and were willing to comply with recommendations from local authorities. The author also reported that localized information sources that cater to the community are a primary source of information, while social media is not a valuable source for information pertinent to COVID-19.

  Geana. (June 25, 2020). Kansans in the Middle of the Pandemic: Risk Perception, Knowledge, Compliance with Preventive Measures, and Primary Sources of Information about COVID-19. Kansas Journal of Medicine. https://www.ncbi.snlm.nih.gov/pmc/articles/PMC7324058/

Other Resources and Commentaries

- Commentary: Rapid Testing of Healthcare Employees for COVID-19: What Can We Learn from the Seattle Experience? – Clinical Infectious Diseases (July 4)
- Prevalence of Mental Health Symptoms in Residential Healthcare Workers in Michigan during the Covid-19 Pandemic – Psychiatry Research (June 30)
- Contact Tracing to Manage COVID-19 Spread—Balancing Personal Privacy and Public Health – Mayo Clinic Proceedings (July 1)
- Prevalence and Predictors of General Psychiatric Disorders and Loneliness during COVID-19 in the United Kingdom – Psychiatry Research (June 30)
- Mounting Clues Suggest the Coronavirus Might Trigger Diabetes – Nature (June 24)
- Racial Capitalism within Public Health: How Occupational Settings Drive COVID-19 Disparities – American Journal of Epidemiology (July 3)
- The Traps of Calling the Public Health Response to COVID-19 "an Unexpected War against an Invisible Enemy" – Journal of Public Health Policy (July 2)
- Azithromycin and SARS-CoV-2 Infection: Where We Are Now and Where We Are Going – Journal of Global Antimicrobial Resistance (July 1)
- Rethink Economics to Help Marginalized People – Nature (June 10)
- The Health of Private Insurance in the US during Covid-19 – BMJ (July 2)
- Are U.S. Hospitals Still "Recession-Proof"? – New England Journal of Medicine (July 1)
- Importance of Face Masks for COVID-19 - a Call for Effective Public Education – Clinical Infectious Diseases (July 2)
- Reopening Colleges and Universities During the COVID-19 Pandemic – Annals of Internal Medicine (July 2)

Report prepared by the UW MetaCenter for Pandemic Preparedness and Global Health Security and the START Center in collaboration with and on behalf of WA DOH COVID-19 Incident Management Team