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 modeling study suggests that Seattle could return to full workplace and community mobility without loss of COVID-19 epidemic control in a scenario that includes high mask compliance, school closures, high levels of testing, and tracing of half of all contacts within 2 days. [More]
- US adults in April and May 2020 were considerably more likely to screen positive for mood disorders compared to US adults in 2019. [More]
- Universal testing for SARS-CoV-2 at a skilled nursing facility with no known COVID-19 cases revealed an 85% prevalence of SARS-CoV-2 infection among residents and 37% prevalence among staff. [More]
- A machine learning method that uses sociodemographic data applied to SARS-CoV-2 testing of pooled specimens could increase efficiency of conventional pooling by up to 42% at disease prevalence up to 25%. [More]

Transmission
- [Pre-print, not peer reviewed] Iterative simulation modeling indicated that aerosol inhalation was likely the dominant contributor to SARS-CoV-2 transmission in the Diamond Princess Cruise Ship outbreak.
  

- [Pre-print, not peer reviewed] Simulation modeling based on fluid dynamics models and mouse experimental models was used to estimate that the median infection risk of contracting SARS-CoV-2 via aerosol exposure for one hour was more than three orders of magnitude lower than the risk due to close contact (13% based on a meta-analysis).
  

Testing and Treatment
- Universal testing of a skilled nursing facility without a known case of COVID-19 in Massachusetts revealed an 85% prevalence of COVID-19 among residents (n=97) and 37% among participating staff (n=97) during a serial testing program over approximately one week. The facility had universal
masking, temperature checks and symptom screen procedures in place for staff for at least two weeks prior to the testing period.


- [Pre-print, not peer reviewed] Escobar et al. developed a pooling method for SARS-CoV-2 testing protocols that uses machine learning to predict the probability of a negative result from sociodemographic data. The technique was most efficient at lower disease prevalence, and showed efficiency gains of 42% with respect to individual testing at disease prevalence up to 25%.


Clinical Characteristics and Health Care Setting

- In a retrospective cohort study of critically ill patients admitted to ICUs in Italy (n=3,988), independent risk factors associated with mortality included older age (HR=1.75), male sex (HR=1.57), history of COPD (HR = 1.68), history of diabetes (HR=1.18), hypercholesterolemia (HR=1.25), and poor respiratory status at ICU admission, as defined by three measures. The hospital mortality rate as of May 30 was 12 per 1000 patient days after a median observation time of 70 days. Eighty-seven percent of patients required invasive mechanical ventilation at the time of ICU admission. Overall mortality was 48% over a median follow-up period of 69 days (range 38-100).


- In a US multicenter cohort study of COVID-19 patients admitted to ICU (n=2,215), independent risk factors associated with 28 day mortality included older age (≥80 vs <40 years of age: OR=11.15), male sex (OR=1.50), obesity (BMI ≥40 vs <25: OR=1.51), coronary artery disease (OR=1.47), active cancer (OR=2.15), and acute organ dysfunction (OR=2.43 to 2.61). Patients admitted to a hospital with fewer ICU beds had a higher risk of death (<50 vs ≥100 ICU beds: OR=3.28). Overall, 35% of the cohort died within 28 days.


- Sattar et al. analyzed participants (n=4,855) from the UK Biobank and found a strong association between BMI and a positive SARS-CoV-2 test and COVID-19 related death. The gradient of risk across the range of BMI was steeper among those under 70 for COVID-19 related death. BMI was more strongly related to test positivity and death among members of non-white racial groups.

Using deep immune profiling, Mathew et al. characterized immune responses among 125 patients with COVID-19 and identified 3 different immunotypes with unique T cell, B cell, and lymphocyte responses. These findings may suggest fundamental differences in immunological responses to SARS-CoV-2 infection.


Mental Health and Personal Impact

Results from participants (n=336,525) from US Census Bureau-administered nationally representative probability samples found that compared to US adults in 2019, US adults in April and May 2020 were more than 3-times more likely to screen positive for depressive disorders, anxiety disorders, or both, with more than 1 out of 3 screening positive for both.


Results from a cross-sectional survey of Canadian youth (n=622) already participating in Mental Health and Substance Abuse studies, self-reports of prepandemic mental health compared to current mental health show statistically significant deterioration of mental health across both clinical and community samples. Self-reported substance use declined both in clinical and community samples, and some participants report some positive impacts.


Modeling and Prediction

[Pre-print, not peer reviewed] Using detailed demographic, mobility, and epidemiological data for the Seattle region to calibrate an agent-based model, Kerr et al. assessed the requirements for implementing a successful "test-trace-quarantine" strategy and found that if high mask compliance and school closures remain in place, realistic levels of testing (~4,000 routine tests per day) and tracing (50% of all contacts traced within 2 days) are sufficient to maintain epidemic control despite full return to workplace and community mobility.


Public Health Policy and Practice

[Pre-print, not peer reviewed] Using publicly-available death registration data, Aburto et al. performed a demographic analysis of all-cause mortality during the first 26 weeks of 2020 in England and Wales and estimated 53,937 excess deaths (54% male). These deaths represent a 31% increase in mortality compared to the expected level based on previous years. The investigators also found a life expectancy at birth decrease of 1.7 for females and 1.9 years for males relative to 2019, respectively.

Other Resources and Commentaries

- **Symptom Profiles of a Convenience Sample of Patients with COVID-19 — United States, January–April 2020** – MMWR (July 17)
- **Estimating the Seroprevalence of SARS-CoV-2 Infections Systematic Review** – medRxiv (July 15)
- **Covid-19 Infection and Attributable Mortality in UK Long Term Care Facilities Cohort Study Using Active Surveillance and Electronic Records (March-June 2020)** – medRxiv (July 15)
- **A Health Care Workers Mental Health Crisis Line in the Age of COVID-19** – Depression and Anxiety (July 15)
- **Living in the Midst of Fear: Depressive Symptomatology among US Adults during the COVID-19 Pandemic** – Depression and Anxiety (July 15)
- **Meta-Analysis of Outcomes of Patients with COVID-19 Infection with versus without Gastrointestinal Symptoms** – Baylor University Medical Center Proceedings (July 2)
- **Viral Load of SARS-CoV-2 across Patients and Compared to Other Respiratory Viruses** – medRxiv (July 16)
- **Post Lockdown COVID-19 Seroprevalence and Circulation at the Time of Delivery France** – medRxiv (July 15)
- **Aging, Male Sex, Obesity, and Metabolic Inflammation Create the Perfect Storm for COVID-19** – Diabetes (July 15)
- **Long-Term Outcome of Short-Course High-Dose Glucocorticoids for SARS: A 17-Year Follow-up in SARS Survivors** – Clinical Infectious Diseases (July 16)
- **Use of Wearable Technology to Enhance Response to the Coronavirus (COVID-19) Pandemic** – Public Health (July 1)
- **Potently Neutralizing and Protective Human Antibodies against SARS-CoV-2** – Nature (July 15)
- **SARS-CoV-2-specific T cell immunity in cases of COVID-19 and SARS, and uninfected controls** – Nature (July 15)

*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*