



2019-nCoV Literature Situation Report (Lit Rep)

July 16, 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 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- *[Pre-print, not peer reviewed]* Iterative simulation modeling indicated that aerosol inhalation was likely the dominant contributor to SARS-CoV-2 transmission in the Diamond Princess Cruise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.
Azimi et al. (July 15, 2020). Mechanistic Transmission Modeling of COVID-19 on the Diamond Princess Cruise Ship Demonstrates the Importance of Aerosol Transmission. Pre-print downloaded July 16 from <https://doi.org/10.1101/2020.07.13.20153049>
- *[Pre-print, not peer reviewed]* Simulation modeling based on fluid dynamics models and mouse experimental models was used to estimate that the median infection risk of contracting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).
Zhang and Wang. (July 15, 2020). Comparison of the COVID-19 Infection Risks by Close Contact and Aerosol Transmission. Pre-print downloaded July 16 from <https://doi.org/10.1101/2020.07.13.20152900>

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



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masking, temperature checks and symptom screen procedures in place for staff for at least two weeks prior to the testing period.

Goldberg et al. (July 15, 2020). Presymptomatic Transmission of SARS-CoV-2 Amongst Residents and Staff at a Skilled Nursing Facility: Results of Real-Time PCR and Serologic Testing. Clinical Infectious Diseases. <https://doi.org/10.1093/cid/ciaa991>

- [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%.

Escobar et al. (July 15, 2020). Smart Pooling AI-Powered COVID-19 Testing. Pre-print downloaded July 16 from <https://doi.org/10.1101/2020.07.13.20152983>

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).

Grasselli et al. (July 15, 2020). Risk Factors Associated With Mortality Among Patients With COVID-19 in Intensive Care Units in Lombardy, Italy. JAMA Internal Medicine.

<https://doi.org/10.1001/jamainternmed.2020.3539>

- 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.

Gupta et al. (July 15, 2020). Factors Associated With Death in Critically Ill Patients With Coronavirus Disease 2019 in the US. JAMA Internal Medicine.

<https://doi.org/10.1001/jamainternmed.2020.3596>

- 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.

Sattar et al. (June 30, 2020). BMI and Future Risk for COVID-19 Infection and Death across Sex, Age and Ethnicity: Preliminary Findings from UK Biobank. Diabetes & Metabolic Syndrome: Clinical Research & Reviews.

<https://doi.org/10.1016/j.dsx.2020.06.060>

- 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.

Mathew et al. (July 15, 2020). Deep Immune Profiling of COVID-19 Patients Reveals Distinct Immunotypes with Therapeutic Implications. Science. <https://doi.org/10.1126/science.abc8511>

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.

Twenge and Joiner. (July 2020). U.S. Census Bureau-Assessed Prevalence of Anxiety and Depressive Symptoms in 2019 and during the 2020 COVID-19 Pandemic. Depression and Anxiety. <https://doi.org/10.1002/da.23077>

- 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.

Hawke et al. (July 14, 2020). Impacts of COVID-19 on Youth Mental Health, Substance Use, and Well-Being: A Rapid Survey of Clinical and Community Samples. The Canadian Journal of Psychiatry. <https://doi.org/10.1177/0706743720940562>

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.

Kerr et al. (July 16, 2020). Controlling COVID-19 via Test-Trace-Quarantine. Pre-print downloaded July 16 from <https://doi.org/10.1101/2020.07.15.20154765>

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.

Aburto et al. (July 16, 2020). Estimating the Burden of COVID-19 on Mortality Life Expectancy and Lifespan Inequality in England and Wales A Population-Level Study. Pre-print downloaded July 16 from <https://doi.org/10.1101/2020.07.16.20155077>

Other Resources and Commentaries

- [SARS-CoV-2 Is Not Present in the Vaginal Fluid of Pregnant Women with COVID-19](#) – The Journal of Maternal-Fetal & Neonatal Medicine (July 16)
- [Covid-19 and Disparities in Nutrition and Obesity](#) – The New England Journal of Medicine (July 15)
- [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)

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