

2019-nCoV Literature Situation Report (Lit Rep)

July 13, 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 review article concludes that the probability of transmission from wastewater is low, but that monitoring of wastewater may be used to detect early signs of an outbreak.** [More](#)
- **A UK study found the number of children admitted for pediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2 from April 1 to May 10 was 14-times higher than the number admitted for similar conditions prior to the SARS-CoV-2 pandemic.** [More](#)
- **A survey of US small businesses found that the majority reported they would likely close if the pandemic lasted for 6 or more months; however both PPP-type grants and SBA disaster relief program-type loans meaningfully improved business owners' expectations.** [More](#)
- **The WHO has produced a risk assessment tool for large gatherings, which includes risk evaluation, risk mitigation, and risk communication.** [More](#)
- **A semi-mechanistic Bayesian hierarchical model found that of state-level social distancing interventions implemented in the US, only lockdowns and school closures had non-trivial impacts on the effective reproductive number.** [More](#)

Non-Pharmaceutical Interventions

- Xie et al. found that adherence to social distancing guidance among participants (2 study populations, n=397 and n=453) surveyed in mid- to late -March was associated with individual differences in working memory capacity, and was partly due to increased awareness of benefits over costs of social distancing. They defined memory capacity as the ability to simultaneously retain multiple pieces of information.

This effect persisted after adjustment for other psychological and socioeconomic factors. Xie et al. (July 2020). Working Memory Capacity Predicts Individual Differences in Social-Distancing Compliance during the COVID-19 Pandemic in the United States. PNAS.

<https://doi.org/10.1073/pnas.2008868117>

Transmission

- A review paper found that, while SARS-CoV-2 in sewage is unlikely to result in transmission due to dilution and environmental factors that reduce viability, wastewater surveillance may be leveraged as an early warning for outbreaks. The authors also review methods to achieve high inactivation of any SARS-CoV-2 particles that remain viable in wastewater.

Foladori et al. (June 2020). SARS-CoV-2 from Faeces to Wastewater Treatment: What Do We Know? A Review. The Science of the Total Environment.

<https://doi.org/10.1016/j.scitotenv.2020.140444>

- Chan et al. studied the concentration of viable (able to infect tissue culture) SARS-CoV-2 after exposure to a range of environmental conditions using the TCID₅₀ assay. They found that SARS-CoV-2 retained viability for 3-5 days when dried and for 7 days when in solution at room temperature. Survival improved at lower temperatures and declined at higher temperatures. The virus also remained viable at a range of pH values, but lost infectivity at pH extremes. Similarly, the virus quickly lost infectivity in watery stool over a 3-day period. The authors found that common laboratory and domestic disinfectants effectively inactivate SARS-CoV-2, as did procedures used to prepare serum for immunoassays and to fix slides for processing in a Biosafety Level 2 laboratory.
Chan et al. (July 2020). Factors Affecting Stability and Infectivity of SARS-CoV-2. The Journal of Hospital Infection. <https://doi.org/10.1016/j.jhin.2020.07.009>

Clinical Characteristics and Health Care Setting

- Davies et al. conducted a multi-center study of children admitted to PICUs in the UK who met the case definition of pediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2 (PIMS-TS) (n=78). Historical data on admissions for similar conditions found a mean of 1 admission per week, as compared to a mean of 14 cases per week during the study period, with a peak value of 32 admissions in one week.
- The median age of patients was 11 years (IQR 8-14), and patients who were male (67%) or members of ethnic minorities (78%) were over-represented relative to their proportions in the general population. Fever, shock, and gastrointestinal symptoms were the most common presenting features. Forty-six percent were invasively ventilated, 36% had evidence of coronary artery abnormalities, 3 (4%) needed extracorporeal membrane oxygenation, and 2 children (3%) died.
Davies et al. (July 2020). Intensive Care Admissions of Children with Paediatric Inflammatory Multisystem Syndrome Temporally Associated with SARS-CoV-2 (PIMS-TS) in the UK: A Multicentre Observational Study. The Lancet. Child & Adolescent Health. [https://doi.org/10.1016/S2352-4642\(20\)30215-7](https://doi.org/10.1016/S2352-4642(20)30215-7)
- *[pre-print, not peer-reviewed]* Based in a case-control study (872 hospitalized COVID-19 patients and 3,488 controls) and a cohort study (1,827 adults admitted with COVID-19) conducted among inner-city adult residents in London, Black and Mixed/Other ethnicity were associated with a significantly higher admission risk than white ethnicity (OR=3.1, 95% CI 2.6-3.7 and OR=3.0, 95% CI 2.3-3.9, respectively). Among patients hospitalized for COVID-19, 29% died over a median of 8 (IQR 4-16) days and Black and Mixed/Other ethnicity were both associated with non-significantly lower risk of mortality.
Zakeri et al. (July 10, 2020). A Case-Control and Cohort Study to Determine the Relationship between Ethnic Background and Severe COVID-19. Pre-print downloaded July 13 from <https://doi.org/10.1101/2020.07.08.20148965>
- A systematic review (n=14 studies) found that ultraviolet germicidal irradiation and vaporized hydrogen peroxide were the most promising decontamination methods for N95 filtered face masks, based on ability to reduce pathogen load while maintaining filtration function and without residual toxicity.
Rodriguez-Martinez et al. (July 2020). Decontamination and Reuse of N95 Filtering Facemask Respirators: A Systematic Review of the Literature. American Journal of Infection Control. <https://doi.org/10.1016/j.ajic.2020.07.004>

- A systematic review (n=37 articles, 24,983 participants) of coronavirus (SARS-CoV, SARS-CoV-2, MERS-CoV) outcomes found the rate of ICU admission was 32% (95%CI 26%, 38%), and pooled case fatality among ICU patients was 39% (95%CI 34%, 43%). Among US studies (n=5), case fatality among ICU patients was 36% (95%CI 18%, 53%).

Abate et al. (2020). Rate of Intensive Care Unit Admission and Outcomes among Patients with Coronavirus: A Systematic Review and Meta-Analysis. PloS One.

<https://doi.org/10.1371/journal.pone.0235653>

- Among 391 COVID-19 patients discharged from the North Middlesex University Hospital in London, 39 re-presented to the hospital emergency department, including 25 that were re-admitted, 2 that required ICU care, 3 that died, and 3 who were discharged home as part of end-of-life care. Average time to re-admission was 10 days, and median age of the re-admission group was higher than the discharged patients (73 vs 59 years). The authors suggest that enhanced follow up at 7 days in a dedicated COVID-19 clinic may prevent re-admission.

Rokadiya et al. (July 2020). COVID-19: Outcomes of Patients with Confirmed COVID-19 Re-Admitted to Hospital. The Journal of Infection. <https://doi.org/10.1016/j.jinf.2020.07.007>

Mental Health and Personal Impact

- *[pre-print, not peer-reviewed]* A cross-sectional survey conducted among adolescents in Norway during the initial phase of the COVID-19 pandemic found that television and family were the main sources of pandemic-related health information, and that higher health literacy was associated with a decrease in socializing with friends. Being quarantined or isolated, or having confirmed or suspected COVID-19, were associated with reduced health-related quality of life, but were not associated with seeing fewer friends than normal.

Riiser et al. (July 10, 2020). Adolescents' Health Literacy Health Protective Measures and Health-Related Quality of Life during the Covid-19 Pandemic. Pre-print downloaded July 13 from

<https://doi.org/10.1101/2020.07.08.20148916>

Modeling and Prediction

- *[pre-print, not peer-reviewed]* Modeling of state-level interventions to control COVID-19 indicates that only school closures and lockdowns have a non-trivial impact on effective reproductive numbers. Olney et al. use an established semi-mechanistic Bayesian hierarchical model to estimate the effect of state-level interventions on SARS-CoV-2 transmission in the US. Infection fatality is parameterized for each state using state-level age distributions. All interventions that targeted the general population were evaluated, including instructions to isolate and practice social distancing, school closures, banning of sporting events and public gatherings, and lockdown. The model was fit from 30 days before the state experienced 7 deaths, up to April 25.

Olney et al. (July 11, 2020). Estimating the Effect of Social Distancing Interventions on COVID-19 in the United States. Pre-print downloaded July 13 from

<https://doi.org/10.1101/2020.07.10.20151001>

- *[pre-print, not peer-reviewed]* Huber et al. present a mathematical model that reflects the effect of social distancing interventions on contact structures, allowing for fast transmission within households and slow transmission between households. They show that epidemic growth depends on household size, but this effect is attenuated beyond a threshold (following a square root law),

suggesting that establishment of larger households (i.e., social circles) may be preferred to re-integration of all contacts during re-opening.

Huber et al. (July 11, 2020). A Minimal Model for Household Effects in Epidemics. Pre-print downloaded July 13 from <https://doi.org/10.1101/2020.07.09.20150227>

Public Health Policy and Practice

- A survey of nearly 6,000 small businesses in the US found that small firms are financially fragile and that only 39% expected they could stay open if the crisis lasted 6 months or longer, resulting in an estimated 35.1 million jobs lost. Both grants-based programs (consistent with the Paycheck Protection Program) and traditional loans with rapid delivery and sufficient liquidity (consistent with the Small Business Administration's disaster relief program) were found to meaningfully shift business owners' expectations about survival; however grants-based programs had a far higher cost to the government.

Bartik et al. (July 2020). The Impact of COVID-19 on Small Business Outcomes and Expectations. PNAS. <https://doi.org/10.1073/pnas.2006991117>

- The World Health Organization published a risk assessment tool for mass gatherings organized around three pillars: risk evaluation, risk mitigation, and risk communication. This tool is available for download as an Excel file, and includes a risk versus mitigation decision matrix to facilitate planning.

Guidance for Authorities and Organizers of Sports Events Planning Mass Gatherings during the Current COVID-19 Pandemic. <https://www.who.int/publications/i/item/10665-333187>

- Among a representative sample of students and staff from a large school in Santiago, Chile that experienced a SARS-CoV-2 outbreak in mid-March, 10% of students and 17% of staff were antibody positive by mid-May, with younger students more likely to be seropositive. Forty percent of positive students and 18% of positive staff were asymptomatic, and the most common symptoms were fever (children and adults), abdominal pain (children), and chest pain (adults).

Torres et al. (July 2020). SARS-CoV-2 Antibody Prevalence in Blood in a Large School Community Subject to a Covid-19 Outbreak: A Cross-Sectional Study. Clinical Infectious Diseases. <https://doi.org/10.1093/cid/cia955>

Other Resources and Commentaries

- [Cities — Try to Predict Superspreading Hotspots for COVID-19](#) – Nature (July 10)
- [Comparative in Silico Design and Validation of GPS CoVID-19 Dtec-RT-QPCR Test](#) – Journal of Applied Microbiology (July 11)
- [Meat Plants—a New Front Line in the Covid-19 Pandemic](#) – BMJ (July 9)
- [COVID-19: The Worst May Be yet to Come](#) – The Lancet (July 11-17)
- [Social Inequalities and Collateral Damages of the COVID-19 Pandemic: When Basic Needs Challenge Mental Health Care](#) – International Journal of Public Health (July 10)
- [Retraction and Republication: Cardiac Toxicity of Hydroxychloroquine in COVID-19](#) – Lancet (July 9)
- [Addition of Tocilizumab to the Standard of Care Reduces Mortality in Severe COVID-19 A Systematic Review and Meta-Analysis](#) – medRxiv (July 11)
- [That Escalated Quickly: Remdesivir's Place in Therapy for COVID-19](#) – Infectious Diseases and Therapy (July 10)

- [Mental Health Implications of COVID-19 on Children with Disabilities](#) – Asian Journal of Psychiatry (May 22)
- [Need for Speed: From Human SARS-CoV-2 Samples to Protective and Efficacious Antibodies in Weeks](#) – Cell (July 9)
- [SARS-CoV-2 on the Neural Battleground](#) – Nature Reviews Immunology (July 10)
- [COVID-19 and Rural Harm Reduction Challenges in the U.S. Southern Mountains](#) – The Journal of Rural Health (July 11)
- [Mounting Evidence Suggests Coronavirus Is Airborne - but Health Advice Has Not Caught Up](#) – Nature (July 8)
- [Covid-19: US Cases Soar as Trump Pushes for Schools to Open](#) – BMJ (July 10)
- [Integrated Sports and Respiratory Medicine in the Aftermath of COVID-19](#) – The Lancet Respiratory Medicine (July 9)
- [How to Operationalise Human Rights for COVID-19 Measures](#) – BMJ Global Health (July 9)
- [Convalescent Plasma or Hyperimmune Immunoglobulin for People with COVID-19: A Rapid Review](#) – The Cochrane Database of Systematic Reviews (May 14)
- [Event-Specific Interventions to Minimize COVID-19 Transmission](#) – medRxiv (July 10)
- [Obesity and COVID-19: A Call for Action from People Living with Obesity](#) – The Lancet Diabetes & Endocrinology (July 9)
- [The Diagnostic Accuracy of Nucleic Acid Point-of-Care Tests for Human Coronavirus A Systematic Review and Meta-Analysis](#) – medRxiv (July 11)
- [Quantification of SARS-CoV-2 Antibodies with Eight Commercially Available Immunoassays](#) – Journal of Clinical Virology (July 6)
- [Minimization of Spreading of SARS-CoV-2 via Household Waste Produced by Subjects Affected by COVID-19 or in Quarantine](#) – The Science of the Total Environment (July 7)
- [Covid-19: Deaths in Mexico Triple since Reopening Began in June](#) – BMJ (July 9)

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