

2019-nCoV Literature Situation Report (Lit Rep)

December 11, 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

- **School-based mitigation strategies recommended by CDC would cost an estimated 0.3% to 7.1% more than school expenditures reported by states in fiscal year 2018.** [More](#)
- **Analysis of 772 complete SARS-CoV-2 genomes from early in the Boston area epidemic revealed numerous introductions of the virus, including two superspreading events, one of which was a business conference that is linked to as many as 300,000 subsequent infections.** [More](#)
- **A meta-analysis finds that the overall proportion of HCWs that intend to accept COVID-19 vaccination was 56%, with a range across surveys done in 8 countries from 28% to 82%.** [More](#)
- **Patients with a recent diagnosis of cancer were at significantly increased risk for COVID-19 infection and its adverse outcomes in an analysis of more than 70 million US patient records.** [More](#)

Non-Pharmaceutical Interventions

- Mitigation strategies recommended by CDC to prevent SARS-CoV-2 transmission in schools are estimated to cost between a mean value of \$55 per student for materials and consumables (e.g. desk shields, hand sanitizer, and face masks) to \$442 per student for additional custodial staff and transportation. These values represent an additional 0.3% to 7.1% above school expenditures reported by state in fiscal year 2018. Only seven states had a maximum estimate >4.2% for additional resources needed.

Rice et al. (Dec 11, 2020). Estimated Resource Costs for Implementation of CDC's Recommended COVID-19 Mitigation Strategies in Pre-Kindergarten through Grade 12 Public Schools — United States, 2020–21 School Year. MMWR. <https://doi.org/10.15585/mmwr.mm6950e1>

Transmission

- An analysis using 772 complete SARS-CoV-2 genomes collected in Boston in February and March 2020 and genomes published by the Global Initiative on Sharing All Influenza Data found numerous introductions of the virus in the Boston area, including two superspreading events. One event was an international business conference in Boston held in February, from which as many as 300,000 subsequent SARS-CoV-2 cases across the US and around the world can be linked. The second involved a skilled nursing facility that experienced rapid transmission and significant mortality but little broader spread. The study identified over 120 independent introductions of SARS-CoV-2 into the Boston area from March to May 2020. [EDITORIAL NOTE: This manuscript was previously summarized as a pre-print on Aug 25.]

Lemieux et al. (Dec 10, 2020). *Phylogenetic analysis of SARS-CoV-2 in Boston highlights the impact of superspreading events*. *Science*. <https://doi.org/10.1126/science.abe3261>

- [Pre-print, not peer reviewed] Among 730,000 SARS-CoV-2 test results from Los Angeles from August to October 2020, a higher prevalence of SARS-CoV-2 asymptomatic infection was identified among individuals who reported work in construction compared to other occupations and who identified as members of racial and ethnic minority groups. The prevalence of asymptomatic infection among Hispanic individuals was 13.8% compared to 3.1% among non-Hispanic individuals. The authors also identified a higher prevalence of asymptomatic infection among individuals who had been contacted by a representative from a local health department regarding a known SARS-CoV-2 exposure.

Allan-Blitz et al. (Dec 11, 2020). *High Frequency and Prevalence of Community-Based Asymptomatic SARS-CoV-2 Infection*. Pre-print downloaded Dec 11 from <https://doi.org/10.1101/2020.12.09.20246249>

- A meta-analysis of viral RNA shedding of SARS-CoV-2 (79 studies, 5,340 individuals), SARS-CoV (8 studies, 1,858 individuals), and MERS-CoV (11 studies, 799 individuals) found the mean duration of SARS-CoV-2 RNA shedding was 17 days in upper respiratory tract, 14.6 days in lower respiratory tract, 17.2 days in stool, and 16.6 days in serum samples. No study detected live SARS-CoV-2 from culture beyond day 9 of symptoms despite persistently high viral RNA loads. The viral load of SARS-CoV-2 appeared to peak in the first week after symptom onset, compared to peaks at days 10-14 for SARS-CoV and days 7-10 for MERS-CoV.

Cevik et al. (Dec 11, 2020). *SARS-CoV-2, SARS-CoV, and MERS-CoV viral load dynamics, duration of viral shedding, and infectiousness: a systematic review and meta-analysis*. *The Lancet Microbe*. [https://doi.org/10.1016/S2666-5247\(20\)30172-5](https://doi.org/10.1016/S2666-5247(20)30172-5)

Testing and Treatment

- A systematic review of 34 studies (12,057 patients) on detection of SARS-CoV-2 by RT-PCR assays at first use estimated a false-negative rate of 13% (95% CI 9% to 19%), though identified substantial heterogeneity between studies, which ranged in their individual estimates from 1.8% to 58%. The authors were unable to investigate most potential sources of heterogeneity due to data limitations. Only 9 studies reported the interval between symptom onset and testing.

Arevalo-Rodriguez et al. (Dec 10, 2020). *False-negative results of initial RT-PCR assays for COVID-19: A systematic review*. *PLOS ONE*. <https://doi.org/10.1371/journal.pone.0242958>

- Estimates of seroprevalence of antibodies against SARS-CoV-2 among residents of metropolitan Atlanta during April-May 2020 ranged from 4.9% to 3.2%. These estimates were based on antibody tests conducted on residual sera from commercial laboratory samples (4.9% seroprevalence) and a community household survey (3.2% seroprevalence). Compared with more representative surveys, the authors conclude that that commercial sera can provide an approximate measure of seroprevalence.

Bajema et al. (Dec 10, 2020). *Comparison of Estimated SARS-CoV-2 Seroprevalence through Commercial Laboratory Residual Sera Testing and a Community Survey*. *Clinical Infectious Diseases*. <https://doi.org/10.1093/cid/ciaa1804>

- A systematic review and meta-analysis found inconclusive results on the efficacy of remdesivir for treating patients with COVID-19 due to the lack of adequately powered and fully reported randomized trials evaluating efficacy and harms of its use in adult hospitalized COVID-19 patients.
Piscoya et al. (Dec 10, 2020). Efficacy and harms of remdesivir for the treatment of COVID-19: A systematic review and meta-analysis. PLOS ONE. <https://doi.org/10.1371/journal.pone.0243705>
- In a study evaluating ten enzyme immunoassays and three lateral flow chromatography assays, seven immunoassays were shown to have excellent specificity (98 to 100%) and good to excellent positive predictive values (82 to 100%) when used in a low (5%) seroprevalence setting. Sensitivity values as low as 74% and as high as 95% at ≥15 days post symptom onset were observed.
Therrien et al. (Dec 10, 2020). Multicenter Evaluation of the Clinical Performance and the Neutralizing Antibody Activity Prediction Properties of ten high throughput serological assays used in Clinical Laboratories. Journal of Clinical Microbiology. <https://doi.org/10.1128/JCM.02511-20>

Clinical Characteristics and Health Care Setting

- A case-control analysis of electronic medical records from 73.4 million unique patients found that patients with a recent diagnosis of cancer were at significantly increased risk for COVID-19 infection and its adverse outcomes, especially among African Americans.
Wang et al. (Dec 10, 2020). Analyses of Risk, Racial Disparity, and Outcomes Among US Patients With Cancer and COVID-19 Infection. JAMA Oncology. <https://doi.org/10.1001/jamaoncol.2020.6178>
- A retrospective study of all children presenting to the Texas Children's Hospital system who were tested for SARS-CoV-2 (16,554 unique patients), found that 1,215 (7%) patients tested positive, among whom 66% were Hispanic (representing 42% of the total number tested). Most children with detection of SARS-CoV-2 had uncomplicated illness courses, but 8% of children were hospitalized, most of whom had underlying medical conditions, and two patients died.
Foster et al. (Dec 10, 2020). A Surge in Pediatric Coronavirus Disease 2019 Cases: The Experience of Texas Children's Hospital from March to June 2020. Pediatric Infectious Diseases Society. <https://doi.org/10.1093/jpids/piaa164>
- A large cohort study (n=64,781) of patients with COVID-19 treated in 592 US hospitals during April and May 2020 found that the in-hospital mortality rate was 20.3%. Use of statin medications, angiotensin-converting enzyme inhibitors, and calcium channel blockers were associated with decreased odds of mortality. The combination use of hydroxychloroquine and azithromycin was associated with increased odds of mortality.
Rosenthal et al. (Dec 10, 2020). Risk Factors Associated With In-Hospital Mortality in a US National Sample of Patients With COVID-19. JAMA Network Open. <https://doi.org/10.1001/jamanetworkopen.2020.29058>

Vaccines and Immunity

- *[Pre-print, not peer reviewed]* In a systematic review examining the intention of healthcare workers (HCW) to accept COVID-19 vaccination (11 studies, 8,847 HCWs), the overall proportion of HCWs that intend to accept COVID-19 vaccination was 56% (95% CI 44-68%) with a wide range among studies from 28% to 82%. Factors associated with increased HCW willingness to get vaccinated

against COVID-19 included male gender, older age, physician profession, comorbidity, seasonal influenza vaccination, stronger vaccine confidence, individual perceived risk about COVID-19, and contact with suspected or confirmed COVID-19 patients. The studies were conducted among HCW in Europe (5 studies), Asia (3 studies), Africa (2 studies), and North America (1 study) between February and October 2020.

Galanis et al. (Dec 11, 2020). Intention of health care workers to accept COVID-19 vaccination and related factors: a systematic review and meta-analysis. Pre-print downloaded Dec 11 from <https://doi.org/10.1101/2020.12.08.20246041>

Modeling and Prediction

- A modeling study assessing the global impact of travel restrictions due to COVID-19 finds the restrictions are effective primarily in countries with low numbers of cases or that have strong travel links with countries experiencing high rates of infection. The authors suggest that strict untargeted travel restrictions are probably unjustified in many countries, other than those that have both high levels of international travel connections and very low local COVID-19 incidence.

Russell et al. (Dec 07, 2020). Effect of internationally imported cases on internal spread of COVID-19: a mathematical modelling study. The Lancet Public Health.

[https://doi.org/10.1016/S2468-2667\(20\)30263-2](https://doi.org/10.1016/S2468-2667(20)30263-2)

Other Resources and Commentaries

- [Population preferences for inclusive COVID-19 policy responses](#) – The Lancet Public Health (Dec 10)
- [The COVID-19 vaccines rush: participatory community engagement matters more than ever](#) – The Lancet (Dec 10)
- [Lightening the viral load to lessen covid-19 severity](#) – BMJ (Dec 10)
- [COVID-19: working together and making a difference for decision-makers](#) – Cochrane Library (Dec 10)
- [Covid-19: People with history of significant allergic reactions should not receive Pfizer vaccine, says regulator](#) – BMJ (Dec 10)
- [Towards an accurate and systematic characterisation of persistently asymptomatic infection with SARS-CoV-2](#) – The Lancet Infectious Diseases (Dec 10)
- [A Data-Driven Rationale for High-Throughput SARS-CoV-2 Mass Screening Programs](#) – JAMA Network Open (Nov 26)
- [Assessment of an Online Tool to Simulate the Effect of Pooled Testing for SARS-CoV-2 Detection in Asymptomatic and Symptomatic Populations](#) – JAMA Network Open (Dec 10)
- [Bloviating and Bungling the COVID-19 Pandemic](#) – JAMA Network Open (Dec 10)
- [Scientific Rigor in the Age of COVID-19](#) – JAMA Oncology (Dec 10)
- [Checklist to support schools re-opening and preparation for COVID-19 resurgences or similar public health crises](#) – WHO (Dec 10)

Report prepared by the UW Alliance 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