Washington State Department of Health

2019-nCoV Literature   Situation Report (Lit Rep)

March 8, 2021

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

➢ **Two SARS-CoV-2 outbreaks occurred among US university athletic programs during the fall 2020 despite mandatory directly observed daily antigen testing, suggesting that antigen testing along may not be sufficient to prevent outbreaks in congregate settings. More**

➢ **Among 148,494 U.S. adults diagnosed with COVID-19 in March-December 2020, individuals with a BMI near the threshold between healthy weight and overweight generally had the lowest risks for hospitalization, ICU admission, and death, with higher risks associated with higher BMI. More**

➢ **Among US adults with COVID-19 admitted to US medical centers between March 1 and August 31 2020, the highest in-hospital mortality occurred in March (22.1%), and with mortality decreasing each month until the end of the study period in August (6.5%). More**

Non-Pharmaceutical Interventions

• Using high-speed imaging and physics-based analyses, large (> 250 µm) simulated cough droplets were shown to penetrate single- or double-layer mask materials to a significant extent. The authors suggest that expelled droplets may atomize into smaller (< 100 µm) droplets that could remain airborne for longer periods, potentially impacting mask efficacy. For a droplet of initial diameter 620 µm, a single layer mask restricted only 30% of the initial droplet volume, compared to 92% with a double-layered mask. The authors suggest that in the absence of N95 masks being made available to the public, masks with three layers could block droplet spread.

   Sharma et al. (Mar 5, 2021). On Secondary Atomization and Blockage of Surrogate Cough Droplets in Single- and Multilayer Face Masks. Science Advances. https://doi.org/10.1126/sciadv.abf0452

Transmission

• *[Pre-print, not peer-reviewed]* Two SARS-CoV-2 outbreaks occurred among US university athletic programs during the fall 2020 despite mandatory directly observed daily antigen testing, suggesting that antigen testing alone may not be sufficient to prevent outbreaks in congregate settings. In the first outbreak, 32 confirmed cases occurred within an athletics program after the index patient attended a meeting while infectious, despite receiving a negative antigen test that day. 24 (92%) of 26 isolates from this outbreak were closely related, suggesting sustained transmission following an initial introduction event. In the second outbreak, 12 cases occurred among athletes who competed from two universities despite athletes receiving negative antigen test results on the day of the

competition. Sequences from both teams were closely related and unique from strains circulating in the community, suggesting transmission during competition.

> *Moreno et al. (Mar 6, 2021). SARS-CoV-2 Transmission in Intercollegiate Athletics Not Fully Mitigated with Daily Antigen Testing. Pre-print downloaded Mar 8 from https://doi.org/10.1101/2021.03.03.21252838*

Geographic Spread

- *[Pre-print, not peer-reviewed]* A study examining patterns of SARS-CoV-2 mutations via phylogenetics-based analyses found evidence for changes in the selective pressures of specific SARS-CoV-2 genes (such as N and S) that likely coincided with the emergence of the three main 501Y lineages (B.1.1.7, B.1.351, P.1). The analysis included all SARS-CoV-2 sequences in GISAID assigned to these three lineages by Feb 2, 2021. The authors found a significant shift in selective pressures occurred around November 2020. In addition, a significant portion of the ongoing adaptive evolution of these lineages seemed to involve further convergence between them, suggesting that viruses in these distinct lineages may be converging on a similar adaptive endpoint.

  > *Martin et al. (Mar 5, 2021). The Emergence and Ongoing Convergent Evolution of the N501Y Lineages Coincides with a Major Global Shift in the SARS-CoV-2 Selective Landscape. Pre-print downloaded Mar 8 from https://doi.org/10.1101/2021.02.23.21252268*

Testing and Treatment

- A systematic review and meta-analysis of SARS-CoV-2 RT-PCR testing using samples other than naso- or oropharyngeal swabs found that saliva samples had the highest accuracy (92%), with a sensitivity of 84% and specificity of 96%. Deep throat saliva/posterior oropharyngeal saliva samples had an overall accuracy of 80%, with a sensitivity of 90% and specificity of 63%. Samples of interest that could not be sufficiently assessed due to low study numbers included sputum, urine, feces, and tears/conjunctival specimens; however, the authors suggested assay performance was likely to be lower with these sample types.

  > *Moreira et al. (Feb 21, 2021). Diagnosis of SARS-Cov-2 Infection by RT-PCR Using Specimens Other Than Naso- and Oropharyngeal Swabs: A Systematic Review and Meta-Analysis. Diagnostics. https://doi.org/10.3390/diagnostics11020363*

- *[Pre-print, not peer-reviewed]* A meta-analysis of peer-reviewed randomized controlled trials (n = 4 studies, 7,333 patients) did not find differences in survival between patients receiving remdesivir versus usual care or placebo (OR = 0.89, 95% CI 0.65-1.21). Considerable variability in illness severity was noted, with between 0-27% of patients mechanically ventilated at the time of randomization.

  > *Robinson et al. (Mar 8, 2021). Impact of Remdesivir on 28 Day Mortality in Hospitalized Patients with COVID-19 February 2021 Meta-Analysis. Pre-print downloaded Mar 8 from https://doi.org/10.1101/2021.03.04.21252903*

- *[Pre-print, not peer-reviewed]* Between October 2020 and January 2021, a rapid increase in the SARS-CoV-2 variant B.1.1.7 was detected in sewage samples in England. Viral RNA containing B.1.1.7 mutations was first identified in a sample collected in London on November 10 and detected in 7-9% of all sewage samples in November, increasing to >95% by January 2021. The authors suggest that environmental surveillance of sewage may provide an early warning of potential spread of specific variants of concern.

  > *Wilton et al. (Mar 7, 2021). Rapid Increase of SARS-CoV-2 Variant B.1.1.7 Detected in Sewage Samples from England between October 2020 and January 2021. Pre-print downloaded Mar 8 from https://doi.org/10.1101/2021.03.03.21252867*

Vaccines and Immunity

- *[Pre-print, not peer-reviewed]* Willingness to be vaccinated against COVID-19 increased in the US from October 2020 to February 2021 according to results from a nationally-representative internet-panel of US adults (n = 7,840 participants). Between April and October 2020, there was a sharp decline in willingness to be vaccinated (from 74% to 53%), followed by a statistically significant (8%) increase to 61% between October 2020 and February 2021. A significant increase in willingness to be vaccinated was also observed across all demographic groups examined, with participants who identified as Black (16% increase) and Hispanic (12% increase) showing particularly large increases in willingness to be vaccinated.

    Daly et al. (Mar 8, 2021). An Increase in Willingness to Vaccinate against COVID-19 in the US between October 2020 and February 2021 Longitudinal Evidence from the Understanding America Study. Pre-print downloaded Mar 8 from https://doi.org/10.1101/2021.03.04.21252918

- *[Pre-print, not peer-reviewed]* A community-based, home-collected, longitudinal serosurvey of 290 participants before and after vaccination with either the Moderna or Pfizer/BioNTech vaccines found that a prior outpatient COVID-19 diagnosis was associated with strong anti-spike RBD IgG and in vitro neutralizing responses after one vaccine dose. Median IgG concentration and percent neutralization after one dose were each significantly higher among seropositive individuals who reported prior COVID-19 diagnosis (median 47.7 ug/ml, IgG; >99.9% neutralization) compared to those who were seropositive with no history of diagnostic testing (3.4 ug/ml IgG; 62.8% neutralization) and those who were seronegative (2.2 ug/ml IgG; 39.5% neutralization). The latter two groups reached >95% neutralization after the second dose.

    Demonbreun et al. (Mar 8, 2021). Comparison of IgG and Neutralizing Antibody Responses after One or Two Doses of COVID-19 MRNA Vaccine in Previously Infected and Uninfected Persons. Pre-print downloaded Mar 8 from https://doi.org/10.1101/2021.03.04.21252913

- Functional SARS-CoV-2-specific T cell responses were retained 6 months after initial SARS-CoV-2 infection among 100 convalescent donors between March and April 2020. Interferon (IFN)-γ ELISPOT analysis was used to determine the magnitude of the T cell response. Cell responses were present among all donors and characterized by predominant CD4+ T cell responses with strong interleukin (IL)-2 cytokine expression. Median T cell responses were 50% higher in donors who had an initial symptomatic infection, and T cell responses to spike and nucleoprotein/membrane proteins correlated with peak antibody levels. In addition, higher levels of nucleoprotein-specific T cells were associated with preservation of nucleoprotein-specific antibody level.

    Zuo et al. (Mar 5, 2021). Robust SARS-CoV-2-Specific T Cell Immunity Is Maintained at 6 Months Following Primary Infection. Nature Immunology. https://doi.org/10.1038/s41590-021-00902-8

Clinical Characteristics and Health Care Setting

- Among 148,494 U.S. adults diagnosed with COVID-19 between March-December 2020, individuals with a BMI near the threshold between healthy weight and overweight generally had the lowest risks for hospitalization, ICU admission, and death, with higher risks associated with higher BMI. Obesity was a risk factor for hospitalization and death, particularly among adults aged <65 years. Individuals in the highest BMI category (≥45 kg/m^2) had a two-fold greater risk of death and 1.6-fold greater risk of hospitalization compared with patients with a healthy weight. Underweight COVID-19 patients had a 20% higher risk for hospitalization than those with a healthy weight.

    Kompaniyets et al. (Mar 8, 2021). Body Mass Index and Risk for COVID-19–Related Hospitalization, Intensive Care Unit Admission, Invasive Mechanical Ventilation, and Death — United States, March–December 2020. MMWR. Morbidity and Mortality Weekly Report. https://doi.org/10.15585/mmwr.mm7010e4

- A cohort study of 192,550 adults with COVID-19 admitted to US medical centers between March 1 and August 31, 2020 revealed that in-hospital mortality was 13.6% for the cohort. Mortality increased with age; 1.4% of patients aged 18 to 29 years died while 26.6% 80 years or older died. Among ICU patients, 27.8% died. However, there was a significant reduction in mortality over the course of the 6-month period, with the highest mortality in March (3,657 of 16,517 patients died [22.1%]), and mortality decreased each month until the end of the study period in August (1,154 of 17,776 patients died [6.5%]).

  Nguyen et al. (Mar 5, 2021). Outcomes and Mortality Among Adults Hospitalized With COVID-19 at US Medical Centers. JAMA Network Open. https://doi.org/10.1001/jamanetworkopen.2021.0417

Mental Health and Personal Impact

- *[Pre-print, not peer-reviewed]* A systematic review and meta-analysis of longitudinal cohort studies (n = 56) comparing mental health before and during the COVID-19 pandemic showed that there was an overall increase in mental health symptoms that was most pronounced in March-April 2020 (standardized mean change (SMC) = .102) before significantly declining over time (May-July SMC = .067). Mental health symptoms were comparable to pre-pandemic levels by mid-2020 among most population sub-groups and symptom types. Increases in depression and mood disorder symptoms tended to be larger (SMC = 0.22) than those for anxiety and general mental health. The majority of studies sampled European (n=31) or North American (n=16) populations.

  Robinson et al. (Mar 8, 2021). A Systematic Review and Meta-Analysis of Longitudinal Cohort Studies Comparing Mental Health before versus during the COVID-19 Pandemic. Pre-print downloaded Mar 8 from https://doi.org/10.1101/2021.03.04.21252921

- Results from a survey of gay, bisexual, and other men who have sex with men (GBMSM) conducted online from April to May 2020 indicated that in March-May 2020, 12.6% of participants reported experiencing any intimate partner violence (IPV), with higher rates of emotional IPV (10.3%) than sexual (2.2%) or physical (1.8%) IPV. Among those who reported being victims of IPV during lockdown, nearly half reported this was their first IPV experience.

  Stephenson et al. (Mar 2021). COVID-19 and the Risk for Increased Intimate Partner Violence Among Gay, Bisexual and Other Men Who Have Sex With Men in the United States. Journal of Interpersonal Violence. https://doi.org/10.1177/0886260521997454

Modeling and Prediction

- *[Pre-print, not peer-reviewed]* Implementing a nationwide SARS-CoV-2 testing program in the presence of vaccine distribution was projected to potentially save 20,000 lives and increase the US GDP by 2 to 8 times the incremental cost of the tests, according to an economic model that assumed 75% of the US population would be vaccinated by August 1, 2021. If the program were implemented by February 15 instead of March 1, an estimated additional 10,000 lives could be saved given a program with testing every 10 days (approximately 33 million tests/day), and 15,000 lives for a program with testing every 5 days. The model incorporates initial testing with a low-cost antigen test with confirmatory PCR testing following positive antigen tests.

  Atkeson et al. (Mar 5, 2021). Economic Benefits of COVID-19 Screening Tests with a Vaccine Rollout. Pre-print downloaded Mar 8 from https://doi.org/10.1101/2021.03.03.21252815

- A modeling study compared SARS-CoV-2 seroprevalence from different sampling schemes by integrating uncertainty from test characteristics, sample size, and heterogeneity in seroprevalence

across subpopulations into the modeling framework. Sampling schemes informed by demographics and contact networks outperformed uniform sampling techniques. In addition, convenience samples, such as samples from blood donors, could be used to estimate population seroprevalence, with the caveat that extrapolating from such samples without knowing estimates of correlation across age groups might be misleading.

Larremore et al. (Mar 5, 2021). Estimating SARS-CoV-2 Seroprevalence and Epidemiological Parameters with Uncertainty from Serological Surveys. ELife. https://doi.org/10.7554/eLife.64206

Other Resources and Commentaries

- Mental Health Outreach via Supportive Text Messages during the COVID-19 Pandemic: Improved Mental Health and Reduced Suicidal Ideation after Six Weeks in Subscribers of Text4Hope Compared to a Control Population – International Journal of Environmental Research and Public Health (Feb 23)
- COVID-19 and Diagnostic Testing for SARS-CoV-2 by RT-QPCR—Facts and Fallacies – International Journal of Molecular Sciences (Feb 28)
- Multitude of Coronavirus Variants Found in the US — but the Threat Is Unclear – Nature (Mar 5)
- Preparing for COVID-19 Vaccine Roll-out through Simulation Exercises – The Lancet Global Health (Mar 3)
- Model-Based Evaluation of Transmissibility and Reinfection for the P.1 Variant of the SARS-CoV-2 – MedRxiv (Mar 5)
- Anti-SARS-CoV-2 Antibodies Within IVIg Preparations: Cross-Reactivities With Seasonal Coronaviruses, Natural Autoimmunity, and Therapeutic Implications – Frontiers in Immunology (Feb 17)
- What's Important to Know about the New COVID-19 Variants – Canadian Medical Association Journal (Jan 25)
- Evidence-Based Strategies for Clinical Organizations to Address COVID-19 Vaccine Hesitancy – Mayo Clinic Proceedings (Dec 30, 2020)
- COVID-19 Vaccines: Rapid Development, Implications, Challenges and Future Prospects – Human Cell (Mar 7)
- An Early Warning Approach to Monitor COVID-19 Activity with Multiple Digital Traces in near Real Time – Science Advances (Mar 5)
- Presence of SARS-CoV-2 RNA on Playground Surfaces and Water Fountains – Epidemiology and Infection (Mar 8)
- Communicating COVID-19 Information on TikTok: A Content Analysis of TikTok Videos from Official Accounts Featured in the COVID-19 Information Hub – Health Education Research (Mar 1)
- Bringing Light to the Darkness: COVID-19 and Survivance of American Indians and Alaska Natives – Health Equity (Feb 1)
- A Clinician's Primer on Epidemiology for COVID-19 – Med (Feb 27)
- REACT-1 Round 9 Final Report Continued but Slowing Decline of Prevalence of SARS-CoV-2 during National Lockdown in England in February 2021 – MedRxiv (Mar 6)
- Which Are the Best Pandemic Policies? Data Trackers Are Trying to Judge – Nature (Mar 5)
- An Interactive Website Tracking COVID-19 Vaccine Development – The Lancet Global Health (Mar 2)
- ABO Blood Type Association with SARS-CoV-2 Infection Mortality: A Single-center Population in New York City – Transfusion (Mar 5)
- COVID-19 Testing and The Impact of The Pandemic on The Miami Adult Studies on HIV (MASH) Cohort – JAIDS Journal of Acquired Immune Deficiency Syndromes (Feb 24)
- COVID-19 Vaccines: Modes of Immune Activation and Future Challenges – Nature Reviews Immunology (Mar 5)

- [Understanding the Emerging and Reemerging Terminologies amid the COVID-19 Pandemic](#) – Journal of Family Medicine and Primary Care (Dec 31, 2020)
- [Experimental Efficacy of the Face Shield and the Mask against Emitted and Potentially Received Particles](#) – International Journal of Environmental Research and Public Health (Feb 17)

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