2019-nCoV Literature Situation Report (Lit Rep)

June 4, 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

- **A study of persons who received one dose of the AstraZeneca COVID-19 vaccine found that receipt of a heterologous boost with the Pfizer-BioNTech vaccine induced significantly higher frequencies of spike-specific CD4 and CD8 T-cells and neutralizing antibodies compared to receipt of a second dose of AstraZeneca, which the authors conclude suggests a heterologous vaccination strategy may be acceptable in persons unable to receive a second dose of AstraZeneca.** More
- **A review of COVID-19 associated hospitalizations among adolescents aged 12-17 years (N=204) found that nearly 1 in 3 required ICU admission, 5% required invasive mechanical ventilation, and no deaths occurred. The rate of hospitalization was lower than among adults 18 years or older but higher than among children aged 5-11 and exceeded seasonal influenza-associated hospitalizations during comparable periods.** More
- **A study of contact tracing programs in 13 US health departments and 1 Indian Health Service Unit found that 2 out of 3 individuals with SARS-CoV-2 infection (N=74,185) were either not reached for interview or named no contacts when interviewed. Positive test prevalence was higher among named contacts than among the general population. The authors suggest that these findings indicate that despite being a high-yield activity for case finding, contact tracing had a suboptimal impact on SARS-CoV-2 transmission**. More

Transmission

- A study of persons with recent contact with patients with SARS-CoV-2 (N=4,550) found that risk of transmission was highest among persons living in dormitories (28%) and was similar for persons with household contact (13%) and those with close contact outside of their residence (11%). The transmission rate in these three groups were significantly higher than among those who had low-risk contact with SARS-CoV-2 outside their residence (3%). However, no secondary transmission occurred in two of three dormitories included in the study, where mask wearing was enforced and residents did not share rooms. The authors conclude that appropriate infection control measures and quarantine of residents with SARS-CoV-2 infection can decrease the risk of secondary transmission in group living environments.

  Akaishi et al. (June 2021). COVID-19 Transmission in Group Living Environments and Households. Scientific Reports. https://doi.org/10.1038/s41598-021-91220-4

- *[Pre-print, not peer-reviewed]* A modeling study found that the effective reproduction number of B.1.617.2 (WHO label Delta, first described in India) is almost certainly higher than that of B.1.1.7

(WHO label Alpha). The study used genomically sequenced cases from the UK diagnosed between March and May 2021 and excluded recent travelers in order to reflect local transmission patterns. The study found that the degree of increased transmissibility of B.1.617.2 was large and varied with the distribution of the time from infection to transmission from 43% higher to 115% higher transmissibility compared to B.1.1.7. Given these results, the author suggests that increasing vaccination coverage may not be sufficient to reduce the reproductive number while NPIs are further relaxed.

Dagpunar. (June 3, 2021). Interim Estimates of Increased Transmissibility Growth Rate and Reproduction Number of the Covid-19 B.1.617.2 Variant of Concern in the United Kingdom. Pre-print downloaded Jun 4 from https://doi.org/10.1101/2021.06.03.21258293

Testing and Treatment

- A novel, engineered immunoglobulin M (IgM) intranasally delivered neutralizing antibody demonstrated superior neutralizing activity against multiple SARS-CoV-2 variants in mice, including B.1.1.7 (Delta), P.1 (Gamma), and B.1.351 (Beta). The IgM antibody therapy was >230-fold more potent in reducing SARS-CoV-2 lung viral load than IgG neutralizing antibodies currently in use, to which variants of concern are increasingly resistant. Additionally, the IgM antibodies demonstrated favorable pharmacokinetics and safety in mice. The authors conclude that results may suggest that IgM may be an effective therapeutic for SARS-CoV-2 infection and could potentially be engineered for other respiratory pathogens.

  Ku et al. (June 3, 2021). Nasal Delivery of an IgM Offers Broad Protection from SARS-CoV-2 Variants. Nature. https://doi.org/10.1038/s41586-021-03673-2

- *[Pre-print, not peer-reviewed]* A report from George Washington University, a large urban university in Washington, DC, highlighted the institution's successes in mitigating the spread of SARS-CoV-2 among students and staff. Mitigation measures included development of a dedicated rapid and high-throughput COVID-19 laboratory, weekly and symptomatic SARS-CoV-2 testing, and daily risk screening and symptom monitoring. During the fall 2020 semester, 220 of 38,288 tests (0.5%) performed were positive. Temporal clusters of positive cases mirrored community spread with increases associated with holiday gatherings, while positivity remained lower on campus compared to national statistics and there was little evidence for transmission among persons on-campus. The authors conclude that these results demonstrate the feasibility of on-campus surveillance and public health control of COVID-19.

  Liu et al. (June 3, 2021). Implementing Mandatory Testing and a Public Health Commitment to Control COVID-19 on a College Campus. Pre-print downloaded Jun 4 from https://doi.org/10.1101/2021.05.30.21258071

- *[Pre-print, not peer-reviewed]* A comparison of four commercially available RNA extraction kits found that the Zymo Quick-RNA Viral kit yielded the most consistent, timely, and accurate results for detection of SARS-CoV-2 in wastewater from a college campus. Although wastewater-based surveillance has been performed as an early detection system for enteric viruses, most of these viruses are non-enveloped, whereas SARS-CoV-2 is enveloped, which makes detection of viral RNA challenging. The authors note that the Zymo kit may be best suited for smaller population densities.

  O'Brian et al. (June 3, 2021). A Comparison of Four Commercially Available RNA Extraction Kits for Wastewater Surveillance of SARS-CoV-2 in a College Population. Pre-print downloaded Jun 4 from https://doi.org/10.1101/2021.06.01.21257858

Vaccines and Immunity

- *[Pre-print, not peer-reviewed]* A study of persons who received one dose of the AstraZeneca SARS-CoV-2 vaccine (N=129) found that a heterologous boost with the Pfizer-BioNTech vaccine induced significantly higher frequencies of spike-specific CD4 and CD8 T-cells and neutralizing antibodies compared to receipt of a second dose of AstraZeneca. These neutralizing antibodies were highly effective against B.1.1.7 (Alpha), B.1.351 (Beta), and P.1 (Gamma) variants. The levels of antibodies produced by those receiving the Pfizer-BioNTech booster following AstraZeneca were similar to those among persons who received two doses of Pfizer-BioNTech. The authors recommend larger longitudinal studies to characterize the duration of immune responses and COVID-19-related clinical endpoints in persons receiving heterologous vaccinations.

  Barros-Martins et al. (June 3, 2021). Humoral and Cellular Immune Response against SARS-CoV-2 Variants Following Heterologous and Homologous ChAdOx1 NCoV-19BNT162b2 Vaccination. Pre-print downloaded Jun 4 from https://doi.org/10.1101/2021.06.01.21258172

- *[Pre-print, not peer-reviewed]* A prospective cohort study (N=3,975) of healthcare personnel and other frontline workers estimated the real-world effectiveness of Pfizer-BioNTech and Moderna COVID-19 vaccines and found that the adjusted effectiveness of full vaccination was 92% (95% CI 76-97%) and effectiveness of partial vaccination was 81% (95% CI 64-90%). Additionally, among partially or fully vaccinated participants who became infected SARS-CoV-2, mean viral RNA load was 40% lower, the risk of self-reported febrile COVID-19 was 58% lower, and vaccinated individuals experienced 2.3 fewer days spent sick in bed compared to unvaccinated participants with SARS-CoV-2 infection. The authors conclude that these results indicate that mRNA vaccines are highly effective among working-age adults in preventing SARS-CoV-2 infection and decreasing viral load, symptoms, and illness duration.

  Thompson et al. (June 3, 2021). Prevention and Attenuation of COVID-19 by BNT162b2 and mRNA-1273 Vaccines. Pre-print downloaded Jun 4 from https://doi.org/10.1101/2021.06.01.21257987

Clinical Characteristics and Health Care Setting

- A review of COVID-19 associated hospitalizations among adolescents aged 12-17 years (N=204) found that the rate of hospitalization peaked at 2.1 per 100,000 in early January 2021, declined to 0.6 in mid-March, and rose to 1.3 in April. Among hospitalized adolescents, nearly 1 in 3 required ICU admission, 5% required invasive mechanical ventilation, and no deaths occurred. The rate of hospitalization was lower than among adults 18 year or older, but higher than among children aged 5-11 and exceeded seasonal influenza-associated hospitalizations during comparable periods. The authors state that it is important to note that adolescents who met the COVID-19 case definition but were hospitalized for reasons not related to COVID-19 were included in rate calculations, potentially overestimating hospitalization rates.

  Havers et al. (June 4, 2021). Hospitalization of Adolescents Aged 12–17 Years with Laboratory-Confirmed COVID-19 — COVID-NET, 14 States, March 1, 2020–April 24, 2021. MMWR. https://doi.org/10.15585/mmwr.mm7023e1

- *[Pre-print, not peer-reviewed]* A prospective cohort study found that persons with persistent symptoms following COVID-19 infection had an elevated diffuse inflammatory cytokine profile at 8 months post SARS-CoV-2 infection, which was not observed in age/gender matched asymptomatic COVID-19 survivors, healthy controls, or persons who survived other human coronaviruses. Additionally, persons with persisting symptoms had a lack of naïve T and B cell reconstitution,

suggesting immunological inflammation at a cellular level. The authors hypothesize that this prolonged inflammation and abnormal immune profile may be the underlying cause of symptomologies characterized as "long COVID".

Phetsouphanh et al. (June 3, 2021). Immunological Dysfunction Persists for 8 Months Following Initial Mild-Moderate SARS-CoV-2 Infection. Pre-print downloaded Jun 4 from https://doi.org/10.1101/2021.06.01.21257759

- A large retrospective cohort study of persons with chronic obstructive pulmonary disease (COPD) (N=27,810) found that inhaled corticosteroid therapy did not increase COVID-19 related healthcare utilization or mortality. There were no statistically significant differences observed in hospitalization, ICU admission, endotracheal intubation, mechanical ventilation, or mortality among persons with a positive SARS-COV-2 test after adjusting for demographics, month of SARS-CoV-2 testing, and comorbidities known to be associated with severe COVID-19. The authors report that these findings should encourage clinicians to continue inhaled corticosteroid therapy for persons with COPD during the COVID-19 pandemic.

  Sen et al. (June 3, 2021). Inhaled Corticosteroids Do Not Adversely Impact Outcomes in COVID-19 Positive Patients with COPD: An Analysis of Cleveland Clinic's COVID-19 Registry. PLOS ONE. https://doi.org/10.1371/journal.pone.0252576

Mental Health and Personal Impact

- A qualitative study of 196 Canadian adults who use psychoactive substances or were enrolled in opioid agonist treatment found that most participants experienced disruptions in service access and treatment disruptions during 2020. Disrupted services included harm reduction services, withdrawal treatment, medical treatment, mental health care, shelters/housing, and food banks. The reduced access to services resulted in increased high-risk substance use behaviors, including unaccompanied substances use, sharing/re-using of supplies, and overdose events. However, some participants reported greater access to "take-home" opioid agonist treatment and prescription deliveries. The authors suggest that these results highlight the need for novel and effective adaptations of critical health services for persons who use substances during widespread disruptions to health care.

  Russell et al. (Oct 2021). Identifying the Impacts of the COVID-19 Pandemic on Service Access for People Who Use Drugs (PWUD): A National Qualitative Study. Journal of Substance Abuse Treatment. https://doi.org/10.1016/j.jsat.2021.108374

Public Health Policy and Practice

- *[Pre-print, not peer-reviewed]* A population-based propensity-score matched cohort study of all incident laboratory-confirmed COVID-19 cases in Ontario, Canada found that SARS-CoV-2 variants of concern are associated with a higher odds of hospitalization (OR=2.3), ICU admission (OR=3.3), and mortality among persons hospitalized (OR=1.6) and not hospitalized (OR=1.8) for COVID-19 relative to earlier wild-type strains. The findings are consistent with previously published data suggesting a higher mortality among persons infected with B.1.1.7 (Alpha) and highlight the additional impact of these variants on utilization of healthcare resources. The authors suggest that the current and future phase of the pandemic, in which variants comprise a higher proportion of COVID-19 cases, will result in higher demand on health systems until widespread vaccination can be achieved.

  Erman et al. (June 3, 2021). Variant-of-Concern-Attributable Health and Health System-Related Outcomes a Population-Level Propensity-Score Matched Cohort Study. Pre-print downloaded Jun 4 from https://doi.org/10.1101/2021.06.02.21257869

- A cross-sectional study of contact tracing programs in 13 US health departments and 1 Indian Health Service Unit across 11 states found that 2 out of 3 individuals with SARS-CoV-2 infection (N=74,185) were either not reached for interview or named no contacts when interviewed. A mean of 0.7 contacts per case were reached by telephone by public health authorities and only 0.5 per case were monitored. In 9 locations, the median time from specimen collection to contact notification was 6 days or less. In 6 of 8 locations with population comparison data, positive test prevalence was higher among named contacts than among the general population. The authors suggest these findings indicate that despite being a high-yield activity for case finding, contact tracing had a suboptimal impact on SARS-CoV-2 transmission.

  Lash et al. (June 2021). COVID-19 Case Investigation and Contact Tracing in the US, 2020. JAMA Network Open. https://doi.org/10.1001/jamanetworkopen.2021.15850

Other Resources and Commentaries

- Radiation Recall Dermatitis Triggered by Inactivated COVID-19 Vaccine – Clinical and Experimental Dermatology (June)
- Addressing the Clinical Impact of COVID-19 on Pediatric Mental Health – Journal of Pediatric Health Care (Mar)
- Analytical Comparison of Nine SARS-CoV-2 Antigen-Detecting Rapid Diagnostic Tests for Emerging SARS-CoV-2 Variants – MedRxiv (June 3)
- US College Covid-19 Vaccine Mandates Don't Consider Immunity or Pregnancy, and May Run Foul of the Law – BMJ (Clinical Research Ed.) (June)
- YouTube as a Source of Public Health Information Regarding COVID-19 Vaccination: An Assessment of Reliability and Quality of Video Content – JMIR Public Health and Surveillance (May)
- COVID-19 Severity and COVID-19-Associated Deaths Among Hospitalized Patients with HIV Infection - Zambia, March-December 2020 – MMWR (June)
- The Role of Religiosity in COVID-19 Vaccine Hesitancy – Journal of Public Health (Oxford, England) (June)
- Failing the Frail: The Need to Broaden the COVID-19 Case Definition for Geriatric Patients – Clinical Medicine (Mar 2)
- Social Media and the Surge: Emergency Physician Twitter Use in the Covid-19 Pandemic as a Potential Predictor of Impending Surge. (Preprint) – Journal of Medical Internet Research (Mar 8)
- The Missing Season: The Impacts of the COVID-19 Pandemic on Influenza – Vaccine (May)

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