2019-nCoV Literature Situation Report (Lit Rep)

March 10, 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

- **Among children with multisystem inflammatory syndrome associated with SARS-CoV-2 infection, ICU admission was more likely among older children (6–12 years, aOR = 1.9; 13–20 years, aOR = 2.6) compared with those aged 0–5, non-Hispanic Black than non-Hispanic white patients (aOR = 1.6), and among patients experiencing shortness of breath (aOR = 1.9) and abdominal pain (aOR = 1.7). More**
- **There were substantial racial and ethnic disparities in COVID-19 incidence among people under age 25 in the US (n = 689,672) during January-April 2020 (RR range = 1.1-4.6), which generally decreased during May-December (RR range = 0.37-1.69), largely due to increased incidence among white individuals. More**
- **A cohort study in Denmark estimated that the Pfizer/BioNTech vaccine efficacy within 7 days was 52% among long term care facility residents (LTCF) and 46% among health care workers, which increased to 64% and 90%, respectively, beyond seven days of immunization. No protective effect was observed for LTCF residents after the first dose. More**

Non-Pharmaceutical Interventions

- *[Pre-print, not peer-reviewed]* A study using daily media searches to identify publicly announced COVID-19–related school closures lasting ≥1 day in the United States, and statewide school closure policies from state government websites, found that the vast majority of the 600 districts sampled in the study offered distance learning (91%) and continued provision of subsidized meal programs (79%) during closures. The first school closure occurred on February 27, 2020 in Washington State, and by March 30, 2020 all but one US public school district was closed. In total, around 100,000 public schools were closed for ≥8 weeks, affecting >50 million K-12 students.

  Zviedrite et al. (Mar 9, 2021). COVID-19-Associated School Closures and Related Efforts to Sustain Education and Subsidized Meal Programs United States February 18-June 30 2020. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.05.21252848

Transmission

- *[Pre-print, not peer-reviewed]* Whole genome sequencing of 2,172 remnant nasal/nasopharyngeal swab samples from 44 counties in California identified a novel SARS-CoV-2 variant characterized by three mutations in the spike protein named B.1.427/B.1.429 or 20C/L452R. This variant emerged around May 2020, and by January 29, 2021 represented >50% of sequenced cases, exhibiting an

estimated 19-24% increase in transmissibility relative to circulating wild-type strains. Antibody neutralization assays showed 4.0-6.7-fold decreases in neutralizing titers from convalescent patients and 2.0-fold decreases in vaccine recipients.

Deng et al. (Mar 9, 2021). Transmission Infectivity and Antibody Neutralization of an Emerging SARS-CoV-2 Variant in California Carrying a L452R Spike Protein Mutation. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.07.21252647

Testing and Treatment

- A study that identified highly potent human monoclonal antibodies (mAbs) found that the most potent mAbs recognized the SARS-CoV-2 spike protein receptor-binding domain, followed by those that recognized the S1 domain, the spike protein trimer, and the S2 subunit. Only 1.4% neutralized the virus with a potency of 1–10 ng/mL. The authors also engineered the most potent mAb (J08) to have an enhanced half-life and reduced risk of antibody-dependent enhancement, which neutralized wild-type virus and emerging variants containing D614G, E484K, and N501Y substitutions.

  Andreano et al. (Feb 23, 2021). Extremely Potent Human Monoclonal Antibodies from COVID-19 Convalescent Patients. Cell. https://doi.org/10.1016/j.cell.2021.02.035

Vaccines and Immunity

- *[Pre-print, not peer-reviewed]* A study of vaccine-induced polyclonal antibodies and monoclonal antibodies (mAbs) from subjects who received SARS-CoV-2 mRNA vaccines found that polyclonal antibody responses were robust and comparable to or exceeded those observed after natural infection. However, most vaccine-induced mAbs did not demonstrate neutralizing activity. Neutralizing activity of N-terminal domain (NTD) mAbs, but not receptor binding domain (RBD) mAbs, against a virus carrying the E484K substitution and extensive changes in the NTD was abolished, which the authors indicate suggests that some vaccine-induced RBD-binding antibodies may protect against viral variants carrying E484K.

  Amanat et al. (Mar 9, 2021). The Plasmablast Response to SARS-CoV-2 MRNA Vaccination Is Dominated by Non-Neutralizing Antibodies That Target Both the NTD and the RBD. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.07.21253098

- *[Pre-print, not peer-reviewed]* A static simulation model using California as an example to compare the impact of different vaccine prioritization strategies in the United States found that prioritizing older individuals averted the highest proportion of disability-adjusted life years (DALYs, 40% for 5 million individuals vaccinated) and deaths (65%), but the lowest proportion of cases (12%). Prioritizing essential workers averted the lowest proportion of DALYs (25%) and deaths (33%). Allocating vaccines simultaneously by age and location or multiple factors (age, sex, race/ethnicity, location, occupation, and comorbidity status) averted a significantly higher proportion of DALYs (48% and 56%) than any strategy prioritizing by a single risk factor. The authors note that their approach may underestimate the impact of vaccination by not incorporating onward transmission.

  Chapman et al. (Mar 8, 2021). Comparison of COVID-19 Vaccine Prioritization Strategies in the United States. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.04.21251264

- A study of 1,054 US adults surveyed in October 2020 indicated factors associated with intention to receive a COVID-19 vaccine were greater perceptions of vulnerability to COVID-19, receipt of a flu vaccine at the time of the study, liberal political orientation, non-Black race, male gender, and a lower preference for natural versus synthetic medications. While perceived vulnerability to COVID-19 was the strongest predictor of intent to be vaccinated, perceived probability of infection did not predict intention.

Meier et al. (Mar 3, 2021). Predictors of the Intention to Receive a SARS-CoV-2 Vaccine. Journal of Public Health. https://doi.org/10.1093/pubmed/fdab013

- *[Pre-print, not peer-reviewed]* A retrospective registry- and population-based observational cohort study in Denmark estimated that the Pfizer/BioNTech vaccine efficacy within 7 days of receipt was 52% among long term care facility residents (LTCF, n = 39,040) and 46% among health care workers (HCW, n = 331,039), which increased to 64% and 90%, respectively, beyond 7 days of immunization. No protective effect was observed for LTCF residents after the first dose. Among HCW, efficacy was 17% > 14 days after first dose (before second dose). During a median follow-up of 53 days, there were 488 and 5,663 confirmed SARS-CoV-2 cases in the unvaccinated groups, with 57 among LTCF residents and 52 among HCW within the first 7 days following the second dose, and 27 and 10 cases beyond seven days after the second dose.

  Moustsen-Helms et al. (Mar 9, 2021). Vaccine Effectiveness after 1st and 2nd Dose of the BNT162b2 MRNA Covid-19 Vaccine in Long-Term Care Facility Residents and Healthcare Workers - a Danish Cohort Study. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.08.21252200

- *[Pre-print, not peer-reviewed]* Antibody responses to the 501Y.V2 SARS-CoV-2 variant in a cohort of patients hospitalized with COVID-19 in South Africa (n = 89) were found to be robust and showed high levels of cross-reactivity against the virus strain from the first wave. Furthermore, sera from patients infected with 501Y.V2 also neutralized the 501Y.V3 (P.1) variant first described in Brazil, suggesting that the antibody response in patients infected with 501Y.V2 has broad specificity.

  Moyo-Gwete et al. (Mar 6, 2021). SARS-CoV-2 501Y.V2 (B.1.351) Elicits Cross-Reactive Neutralizing Antibodies. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.06.434193

- *[Pre-print, not peer-reviewed]* Sera from individuals who had been previously infected with SARS-CoV-2 and received the vaccine showed equivalent neutralizing responses against the B.1.1.7 variant and original virus strain, while sera from vaccinated individuals with no prior infection showed reduced neutralization against B.1.1.7. Neutralizing activity was assessed against pseudoviruses bearing the spike protein from the original strain or that of the D614G or B.1.1.7 variants.

  Trinite et al. (Mar 5, 2021). Previous SARS-CoV-2 Infection Increases B.1.1.7 Cross-Neutralization by Vaccinated Individuals. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.05.433800

- *[Pre-print, not peer-reviewed]* A panel of 28 SARS-CoV-2 pseudoviruses bearing single or combined spike protein mutations found in the 501Y.V1, 501Y.V2, and 501Y.V3 variants tested against a panel of monoclonal antibodies (mAbs) and convalescent patient plasma collected early in the pandemic showed that the 501Y.V2 variant was the most resistant against mAbs and convalescent plasma, followed by 501Y.V3, and then 501Y.V1. This corresponded with mutations in the N-terminal domain and receptor binding domain (RBD) of the spike protein. Analysis of the RBD carrying triple K417N/E484K/N501Y mutations found in the 501Y.V2 variant bound with mAb P2C-1F11 revealed a potential molecular basis for antibody escape.

  Wang et al. (Mar 9, 2021). Spike Mutations in SARS-CoV-2 Variants Confer Resistance to Antibody Neutralization. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.09.434497

Clinical Characteristics and Health Care Setting

- A retrospective surveillance study of multisystem inflammatory syndrome in children (MIS-C, n = 1,080 patients) found that ICU admission was more likely in patients aged 6–12 years (aOR = 1.9) and

13–20 years (aOR = 2.6) compared with patients 0–5 years, and more likely in non-Hispanic Black than non-Hispanic White patients (aOR = 1.6). Patients experiencing shortness of breath (aOR = 1.9) and abdominal pain (aOR = 1.7) were also more likely to be admitted to the ICU. Similar associations were found for decreased cardiac function, shock, and myocarditis. Coronary artery abnormalities were more common in male (aOR = 1.5) than female patients and in patients with mucocutaneous lesions (aOR = 2.2) or conjunctival injection (aOR = 2.3).

Abrams et al. (Mar 10, 2021). Factors Linked to Severe Outcomes in Multisystem Inflammatory Syndrome in Children (MIS-C) in the USA: A Retrospective Surveillance Study. The Lancet Child & Adolescent Health. https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(21)00050-X/fulltext

Modeling and Prediction

- *[Pre-print, not peer-reviewed]* A modeling study of SARS-CoV-2 transmission and screening programs in pork processing facilities during spring 2020 found that the effectiveness of routine PCR-screening at minimizing disease spread was influenced more by testing frequency than delays in results, the initial reproduction number, or background community transmission rates. While testing every three days prevented ~25- 40% of clinical cases and testing every 14 days averted ~7-13% of clinical cases, the absolute number of additional clinical cases was influenced by whether there was residual immunity from a previous peak. The authors suggest that when using PCR-screening to prevent outbreaks or in the early stages of an outbreak, frequent testing may not prevent a large outbreak.

  VanderWaal et al. (Mar 5, 2021). Modeling Transmission Dynamics and Effectiveness of Worker Screening Programs for SARS-CoV-2 in Pork Processing Plants. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.02.21249552

Public Health Policy and Practice

- *[Pre-print, not peer-reviewed]* A cross-sectional assessment of SARS-CoV-2 seroprevalence among patients in the US receiving dialysis (n = 21,424) in January 2021 with the goal of estimating the seroprevalence in the general US adult population found that seroprevalence was 18.9% in the study sample, which translated to an estimated 18.7% in the US dialysis population, and 21.3% in the US adult population. Patients in the sample were disproportionately older and from minority race/ ethnic groups. Younger people (18-44 years), those self-identifying as Hispanic or living in Hispanic neighborhoods, and those living in the poorest neighborhoods were among the subgroups with the highest seroprevalence (25.9%, 25.1%, 24.8%, respectively). Compared to data from July 2020, there was diminished variability in seroprevalence by geographic region and urban-rural status.

  Anand et al. (Mar 9, 2021). SARS-COV-2 Antibody Prevalence in Patients on Dialysis in the US in January 2021. Pre-print downloaded Mar 10 from https://doi.org/10.1101/2021.03.07.21252786

- There were substantial racial and ethnic disparities in COVID-19 incidence among people under age 25 in the US during January-April 2020 (rate ratio range = 1.1-4.6), which generally decreased during May-December (RR range = 0.37-1.69), largely due to increased incidence among white individuals rather than a decline among racial and ethnic minority groups. The largest disparities persisted among Native Hawaiian and Pacific Islander, American Indian or Alaska Native, and Hispanic people.

  Van Dyke et al. (Mar 10, 2021). Racial and Ethnic Disparities in COVID-19 Incidence by Age, Sex, and Period Among Persons Aged <25 Years — 16 U.S. Jurisdictions, January 1–December 31, 2020. MMWR. Morbidity and Mortality Weekly Report. https://doi.org/10.15585/mmwr.mm7011e1

Other Resources and Commentaries

- Saliva Tests Comparable With Nasal Swabs for SARS-CoV-2 Detection – JAMA (Mar 9)
- Economic Stressors, COVID-19 Attitudes, Worry, and Behaviors among U.S. Working Adults: A Mixture Analysis – International Journal of Environmental Research and Public Health (Feb 27)
- Institutional Distrust among African Americans and Building Trustworthiness in the COVID-19 Response: Implications for Ethical Public Health Practice – Journal of Health Care for the Poor and Underserved (Feb 1)
- The Future of Health Policy in a Partisan United States – JAMA (Mar 5)
- Quantification of the Spread of SARS-CoV-2 Variant B.1.1.7 in Switzerland – MedRxiv (Mar 9)
- The Impact of Health Disparities on COVID-19 Outcomes: Early Findings from a High-Income Country and Two Middle-Income Countries – Journal of Racial and Ethnic Health Disparities (Mar 8)
- Early Estimates of SARS-CoV-2 B.1.1.7 Variant Emergence in a University Setting – MedRxiv (Mar 9)
- Self-Reported Real-World Safety and Reactogenicity of COVID-19 Vaccines An International Vaccine-Recipient Survey – MedRxiv (Mar 8)
- COVIDrugNet a Network-Based Web Tool to Investigate the Drugs Currently in Clinical Trial to Contrast COVID-19 – BioRxiv (Mar 9)
- Health Care Policies and COVID-19 Prevalence: Is There Any Association – International Journal of Health Services (Mar 9)
- Alternatives to Conventional Hospitalisation That Enhance Health Systems' Capacity to Treat COVID-19 – The Lancet Infectious Diseases (Mar 10)
- The Broader Societal Impacts of COVID-19 and the Growing Importance of Capturing These in Health Economic Analyses – International Journal of Technology Assessment in Health Care (Mar 9)
- An Upsurge of SARS CoV-2 B.1.1.7 Variant in Pakistan – MedRxiv (Mar 5)
- Association between ABO Blood Types and Coronavirus Disease 2019 (COVID-19), Genetic Associations, and Underlying Molecular Mechanisms: A Literature Review of 23 Studies – Annals of Hematology (Mar 8)

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