



2019-nCoV Literature

Situation Report (Lit

Rep)

February 18, 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

- **Real-world vaccine efficacy of the Moderna and Pfizer vaccines against SARS-CoV-2 infection at 36 days or longer after the first dose was 89% in a 1:1 propensity score matched analysis of over 60,000 individuals between December 2020 to February 2021. 14-day hospital admission rates were lower among vaccinated individuals who were subsequently diagnosed with COVID-19 compared to matched unvaccinated counterparts (3.7% vs 9.2%).** [More](#)
- **In experiments examining neutralizing activity of sera from Moderna and Pfizer recipients against a panel of mutations found in SARS-CoV-2 variants, neutralizing activity against strains with some or all mutations found in the B.1.351 variant were consistently significantly lower. In contrast, neutralizing activity to mutations representing the D614G variant, B.1.1.7 variant and variants from the P.1 lineage were all comparable.** [More](#), [More](#), [More](#)

Non-Pharmaceutical Interventions

- US county-level data from June to September 2020 show that counties in states that were closed for 0-59 days were more likely to experience rapidly increasing COVID-19 incidence ("rapid riser") than those closed for >59 days, especially in non-metropolitan areas. The probability of being a "rapid riser" county was 43% lower all among counties that had statewide mask mandates at reopening and 67% lower among non-metropolitan counties.
Dasgupta et al. (Feb 14, 2021). Differences in Rapid Increases in County-Level COVID-19 Incidence by Implementation of Statewide Closures and Mask Mandates — United States, June 1–September 30, 2020. Annals of Epidemiology. <https://doi.org/10.1016/j.annepidem.2021.02.006>
- Mobility data in 52 countries show that SARS-CoV-2 transmission decreased significantly with initial mobility reductions in 73% of countries. However, mobility explained a smaller proportion of transmission after relaxation of strict control measures in 80% of countries. In these countries, the predictive ability of mobility changed from a median R^2 of 74% pre-relaxation to 30% post-relaxation.
Nouvellet et al. (Feb 17, 2021). Reduction in Mobility and COVID-19 Transmission. Nature Communications. <https://www.nature.com/articles/s41467-021-21358-2>

Transmission

- *[Pre-print, not peer reviewed]* Incidence of COVID-19 among children aged <18 years in Catalonia, Spain during the first 20 weeks of the 2020-2021 school year remained significantly lower than in the general population, except during late January 2021. Test positivity was also lower among children



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than the general population, except in January 2021, when active screening ceased due to holiday closures, which may have increased the percent of positive tests. Non-pharmaceutical interventions, including mandatory mask wearing, enhanced ventilation and hygiene, and clustering were implemented during most of the school year. Children attending kindergarten through primary school (aged <11 years) had lower incidence than adolescents (12-17 years).

Perramon et al. (Feb 17, 2021). Epidemiological Dynamics of the Incidence of COVID-19 in Children and the Relationship with the Opening of Schools in Catalonia (Spain). Pre-print downloaded Feb 18 from <https://doi.org/10.1101/2021.02.15.21251781>

Testing and Treatment

- *[Pre-print, not peer reviewed]* A systematic review and meta-analysis of nine clinical trials found the antiviral medication favipiravir was associated with a significant clinical improvement (vs control) 7 days after hospital admission (RR=1.24). Risk of viral clearance by 14 days of hospital admission was higher while requirements for supplemental oxygen therapy and mortality were lower among individuals who received Favipiravir; however, these outcomes were not statistically significantly different than controls.

Hassanpour et al. (Feb 17, 2021). The Efficacy and Safety of Favipiravir in Treatment of COVID-19 A Systematic Review and Meta-Analysis of Clinical Trials. Pre-print downloaded Feb 18 from <https://doi.org/10.1101/2021.02.14.21251693>

Vaccines and Immunity

- *[Pre-print, not peer reviewed]* Analysis of neutralizing activity of sera from individuals vaccinated with either 1 or 2 doses of the Moderna or Pfizer vaccines (n=48) against SARS-CoV-2 pseudoviruses bearing spike proteins with the partial or full set of mutations from the B.1.351 variant show up to a 97-fold decrease in neutralization compared to wild-type. Notably, neutralization of B.1.351 was not detectable in samples from 36% (8/22) recipients of 2-dose Pfizer vaccine and 50% (2/4) recipients of 2-dose Moderna vaccine. In contrast, other variants such as the D614G variant, the B.1.1.7 variant, and variants from the P.1 lineage had relatively lower reductions in neutralization.
- Assays conducted with sera from 22 of the 2-dose Pfizer vaccine recipients show that neutralization of B.1.351 in the absence of the mutations present in the receptor binding domain (RBD) was comparable to that of D614G, suggesting that the RBD mutations of the B.1.351 variant are key to neutralization resistance.

Garcia-Beltran et al. (Feb 18, 2021). Circulating SARS-CoV-2 Variants Escape Neutralization by Vaccine-Induced Humoral Immunity. Pre-print downloaded Feb 18 from <https://doi.org/10.1101/2021.02.14.21251704>

- Neutralizing activity of sera from recipients of the 2-dose Pfizer vaccine (n=15, 20 serum samples) against wild-type SARS-CoV-2 (USA-WA1/2020) engineered with the full set of spike protein mutations of the B.1.351 variant was weaker than the USA-WA1/2020 strain by approximately two-thirds. Using 50% plaque reduction neutralization testing (PRNT50) on sera obtained 2-4 weeks after the second dose, geometric mean titers against USA-WA1/2020, USA-WA1/2020 with the globally dominant D614G mutation, USA-WA1/2020 with key B.1.351 mutations (K417N, E484K, and N501Y), and USA-WA1/2020 with the full set of B.1.351 mutations were 501, 485, 331, and 184, respectively.

Liu et al. (Feb 17, 2021). Neutralizing Activity of BNT162b2-Elicited Serum — Preliminary Report. New England Journal of Medicine. <https://doi.org/10.1056/NEJMc2102017>

- *[Pre-print, not peer reviewed]* The Moderna and Pfizer vaccines were 89% effective (95% CI: 68-97%) in preventing SARS-CoV-2 infection occurring at least 36 days after the first dose in a 1:1 propensity score matched analysis of over 60,000 individuals in the US between December 2020 to February

2021. Among those subsequently diagnosed with COVID-19, vaccinated patients had significantly lower 14-day hospital admission rates compared to matched unvaccinated counterparts (3.7% vs 9.2%). Vaccine efficacy 7 days after receiving the first dose was 54% (95% CI: 41-64%), which increased over time to a maximum of 93% (95% CI: 70-99%) between days 36-42.

- The authors note that a key limitation of the study was shorter follow-up time compared to the phase 3 trials (27 days vs. 80-90 days); 45% of the vaccinated cohort had only received one vaccine dose for some efficacy analyses. Additionally, bias on seeking PCR testing between vaccinated and unvaccinated patients was not addressed.

Pawlowski et al. (Feb 18, 2021). FDA-Authorized COVID-19 Vaccines Are Effective per Real-World Evidence Synthesized across a Multi-State Health System. Pre-print downloaded Feb 18 from <https://doi.org/10.1101/2021.02.15.21251623>

- Neutralizing activity of sera from recipients of the 2-dose Moderna vaccine in the phase 1 trial (n=45) were similar against a SARS-CoV-2 pseudovirus bearing the spike protein from the original Wuhan-Hu-1 isolate, the D614G variant, as well as against 20E (EU1), 20A.EU2, N439K-D614G, and mink cluster 5 variants. In contrast, neutralizing titers against the D614G variant decreased 2.7-fold against a pseudovirus with a partial set of the mutations in the B.1.351 variant (mutations K417N, E484K, and N501Y), and by 6.4-fold against the full set of B.1.351 mutations. Sera obtained from 8 participants still neutralized the B.1.351 variant at low dilutions. [EDITORIAL NOTE: This article was summarized as a pre-print on January 25, 2021.]

Wu et al. (Feb 17, 2021). Serum Neutralizing Activity Elicited by mRNA-1273 Vaccine — Preliminary Report. New England Journal of Medicine. <https://doi.org/10.1056/NEJMc2102179>

Clinical Characteristics and Health Care Setting

- Analysis of RT-PCR test results in Houston, Texas across two epidemiologic waves from March to August 2020 (n=11,64 samples) show that an increase in the viral load among the samples tested that week preceded the peak of each wave by approximately two weeks. This relationship was more evident during the second wave when the city was reopening from initial lockdown. Individuals from the second wave were more likely to be women, outpatients, and have low cycle thresholds.

Avadhanula et al. (Feb 15, 2021). Viral Load of SARS-CoV-2 in Adults during the First and Second Wave of COVID-19 Pandemic in Houston, TX: The Potential of the Super-Spreader. The Journal of Infectious Diseases. <https://doi.org/10.1093/infdis/jiab097>

- The odds of surviving to hospital discharge among critical COVID-19 patients increased over time in a retrospective cohort study (n=620) in the western US from February to May 20. Overall, 403 (65%) patients were discharged alive, increasing from 60% to 68% between the first 2 weeks of the study period to the last 2 weeks. Odds of survival continued to increase over time after adjusting for both hospital occupancy and percent hospital capacity by patients with confirmed or suspected COVID-19, but decreased when adjusting only for percent hospital capacity by patients with confirmed or suspected COVID-19.

Dale et al. (Feb 17, 2021). Surge Effects and Survival to Hospital Discharge in Critical Care Patients with COVID-19 during the Early Pandemic: A Cohort Study. Critical Care. <https://pubmed.ncbi.nlm.nih.gov/33596975/>

- Cell profiles of children (n=48, aged <18 years) with clinically mild SARS-CoV-2 were characterized by reduced circulating subsets of monocytes, dendritic cells, and natural killer cells during the acute phase of infection. In contrast, adults with SARS-CoV-2 infection (n=70) showed reduced proportions of non-classical monocytes only. Both children and adults who were exposed to SARS-CoV-2 but

tested PCR negative had higher proportions of low-density neutrophils observed up to 7 weeks post exposure.

Neeland et al. (Feb 17, 2021). Innate Cell Profiles during the Acute and Convalescent Phase of SARS-CoV-2 Infection in Children. Nature Communications <https://pubmed.ncbi.nlm.nih.gov/33597531/>

Modeling and Prediction

- A transmission model calibrated to an outbreak in a large urban US jail estimated that R_0 for the first outbreak phase was as high as 8.44. Non-pharmaceutical interventions including reducing the size of the jail population (depopulation), single celling, and asymptomatic testing reduced R_0 to 0.58 by day 37, preventing approximately 83% of the projected cases, hospitalizations, and deaths over 83 days. *Malloy et al. (Feb 17, 2021). Effectiveness of Interventions to Reduce COVID-19 Transmission in a Large Urban Jail: A Model-Based Analysis. BMJ Open. <https://doi.org/10.1136/bmjopen-2020-042898>*

Other Resources and Commentaries

- [COVID-19 and the Collapse of Global Trade: Building an Effective Public Health Response](#) – The Lancet Planetary Health (Feb 1)
- [Indirect HIV Morbidity and Mortality Due to COVID-19](#) – Clinical Infectious Diseases (Feb 13)
- [Addressing COVID-19 Health Disparities through a Regional Community Health Response](#) – Cleveland Clinic Journal of Medicine (Feb 12)
- [Shifting Coronavirus Disease 2019 Testing Policy and Research to Include the Full Translation Pipeline](#) – Open Forum Infectious Diseases (Feb 1)
- [Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine](#) – New England Journal of Medicine (Feb 17)
- [Lessons Learned From an Early Hotspot During the COVID-19 Pandemic.](#) – The American Surgeon (Feb 17)
- [A Novel Patient Values Tab for the Electronic Health Record: A User-Centered Design Approach.](#) – Journal of Medical Internet Research (Feb 17)
- [High Amounts of SARS-CoV-2 Precede Sickness among Asymptomatic Healthcare Workers](#) – The Journal of Infectious Diseases (Feb 13)
- [Keeping Young People Connected during COVID-19: The Role of Online Groups](#) – Archives of Disease in Childhood (Feb 17)
- [An Ayuda to the Least Advantaged: Providing a Program for Those Who Were Hit the Hardest during the COVID-19 Pandemic](#) – Journal of Public Health (Feb 17)
- [No Jab, No Job? Ethical Issues in Mandatory COVID-19 Vaccination of Healthcare Personnel](#) – BMJ Global Health (Feb 17)
- [Moderators of Changes in Smoking Drinking and Quitting Behaviour Associated with the First Covid-19 Lockdown in England](#) – MedRxiv (Feb 17)
- [Delayed Second Dose versus Standard Regimen for Covid-19 Vaccination](#) – New England Journal of Medicine (Feb 17)
- [Evidence and Magnitude of the Effects of Meteorological Changes on SARS-CoV-2 Transmission](#) – PLOS ONE (Feb 17)
- [COVID-19: Investing in Country Capacity to Bridge Science, Policy and Action](#) – BMJ Global Health (Feb 17)
- [Uncovering Ways That Emerging SARS-CoV-2 Lineages May Increase Transmissibility](#) – The Journal of Infectious Diseases (Feb 13)
- [Monoclonal Antibodies for Treating COVID-19](#) – Cleveland Clinic Journal of Medicine (Feb 17)
- [Audio Interview: Viral Variants and Covid-19.](#) – The New England Journal of Medicine (Feb 18)

- [Covid-19: Extra 1.7 Million People in England Are Asked to Shield](#) – BMJ (Feb 17)

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