



2019-nCoV Literature Situation Report (Lit Rep)

March 1, 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 meta-analysis of randomized clinical trials comparing patients with COVID-19 treated with convalescent plasma versus controls found no significant differences in all-cause mortality, length of hospital stay, mechanical ventilation use, clinical improvement, or clinical deterioration.** [More](#)
- **Two studies found that individuals previously infected with SARS-CoV-2 showed stronger immune responses after one dose of the Pfizer-BioNTech vaccine compared to individuals with no prior history of infection.** [More](#) and [More](#)
- **A retrospective cohort study of COVID-19 risk among children and adults in households with an index case of COVID-19 found an overall infection risk of 10%, with median time of 3 days after diagnosis of the index case.** [More](#)
- **The SARS-CoV-2 variant S-614G conferred small increases in binding and replication using *in vitro* models but large competitive advantages using *in vivo* models, potentially explaining the increased prevalence of this strain.** [More](#)

Non-Pharmaceutical Interventions

- Following the full reopening of schools in England in September 2020, COVID-19 cases among children lagged adult rates but ultimately followed similar trends. A strong correlation was observed in regional infection rates between adults and secondary ($R^2=0.96-0.98$), primary ($R^2=0.93-0.94$) and preschool-aged ($R^2=0.62-0.85$) children. The November 2020 lockdown was associated with declines in adult infection rates, which were then followed by declines in student cases one week later. These trends were more pronounced in areas with moderate-to-high infections before lockdown. From November 23, 2020, cases in both adults and children increased rapidly following the spread of the SARS-CoV-2 B.1.1.7 variant.

Mensah et al. (Feb 2021). SARS-CoV-2 Infections in Children Following the Full Re-Opening of Schools and the Impact of National Lockdown: Prospective, National Observational Cohort Surveillance, July-December 2020, England. Journal of Infection.

<https://doi.org/10.1016/j.jinf.2021.02.022>

Transmission

- A mathematical model analyzing retail customer flow and SARS-CoV-2 transmission found that then restricting customers to one-way movement could reduce transmission rates to less than one-third of the rate with two-way movement, if all customers comply and transmission occurs primarily through close contact. The model was calibrated using published epidemiologic data and predicted that for a medium-sized retail store in an area with relatively high COVID-19 prevalence, the

transmission rate (via direct and wake exposure) would be 0.33 infections per day without complete one-way flow compliance.

Shumsky et al. (Mar 16, 2021). *Retail Store Customer Flow and COVID-19 Transmission*.

Proceedings of the National Academy of Sciences. <https://doi.org/10.1073/pnas.2019225118>

- A systematic review and meta-analysis (n = 15 studies, 6,300 patients) estimated that the incubation period for SARS-CoV-2 is 5.7 days (range: 5.2-6.3 days). Data were included through March 31, 2020, and most of the studies included in the meta-analysis used different parametric distributions for calculating the pooled incubation period.

Rai et al. (Feb 23, 2021). *Incubation Period for COVID-19: A Systematic Review and Meta-Analysis*. *Journal of Public Health*. <https://doi.org/10.1007/s10389-021-01478-1>

- A retrospective cohort study of COVID-19 risk among exposed children and adults in households where an index case was diagnosed found an overall infection risk of 10.1%, with median time to diagnosis of 3 days after positive diagnosis of the index case. The study used home addresses recorded in electronic health records to identify the number of household members in the period between March 4 and May 17, 2020. 7,262 index cases were linked to 17,917 additional at-risk individuals assigned to the same addresses, 38.4% of whom resided in households of 6 to 10 people. Independent factors significantly associated with higher transmission risk were age greater than 18 years and multiple comorbid conditions.

Metlay et al. (Feb 26, 2021). *Household Transmission of SARS-CoV-2*. *JAMA Network Open*. <https://doi.org/10.1001/jamanetworkopen.2021.0304>

- The SARS-CoV-2 S-614G variant was found to enhance binding to recombinant human ACE2 receptors, increase replication in lung and nasal cell culture systems, increase replication in a humanized ACE2 mouse model, and increased transmissibility in hamster and ferret SARS-CoV-2 models. While this mutation resulted in small increases in binding and replication in vitro, it conferred larger competitive advantages in vivo, potentially explaining the increased prevalence of this strain.

Zhou et al. (Feb 26, 2021). *SARS-CoV-2 Spike D614G Change Enhances Replication and Transmission*. *Nature*. <https://doi.org/10.1038/s41586-021-03361-1>

Testing and Treatment

- [Pre-print, not peer-reviewed] A study identifying the structural and functional determinants of serum with broad neutralization of SARS-CoV-2 determined that combinations of two antibodies with broadly neutralizing activity decrease the in vitro generation of escape mutants. The structural characteristics of four monoclonal receptor-binding domain-targeting antibodies isolated from three early-outbreak convalescent donors with broadly neutralizing polyclonal serum were described. Individual neutralizing activity of each monoclonal antibody against 12 variants (including B.1.1.7 and B.1.351) was characterized and two of the four antibodies studied (A23-58.1 and B1-182.1) were defined as ultrapotent. Serum was originally obtained from five convalescent donors infected by the original SARS-CoV-2 outbreak strain (WA-1, identified in Washington state).

Wang et al. (Feb 26, 2021). *Antibodies with Potent and Broad Neutralizing Activity against Antigenically Diverse and Highly Transmissible SARS-CoV-2 Variants*. Pre-print downloaded Mar 1 from <https://doi.org/10.1101/2021.02.25.432969>

- A meta-analysis of randomized clinical trials comparing patients with COVID-19 treated with convalescent plasma versus control did not detect any significant differences in all-cause mortality, length of hospital stay, mechanical ventilation use, clinical improvement, or clinical deterioration. Results from 4 published, peer-reviewed RCTs including 1,060 patients indicated that the risk ratio

for mortality was 0.93. After adding 6 unpublished randomized clinical trials and 10,722 patients to the analysis, the risk ratio for mortality was 1.02. Neither of these associations were significant, and the certainty of the evidence was low to moderate for all-cause mortality and low for other outcomes.

Janiaud et al. (Feb 26, 2021). Association of Convalescent Plasma Treatment With Clinical Outcomes in Patients With COVID-19. JAMA. <https://doi.org/10.1001/jama.2021.2747>

Vaccines and Immunity

- Individuals with prior SARS-CoV-2 infection generated strong humoral and cellular responses following a single dose of the Pfizer/BioNTech vaccine, according to an analysis of specimens from healthcare workers in the UK (n = 72). Individuals who had not been previously infected showed weaker T-cell responses and generated lower neutralizing antibody titers (median 615.1 vs. 16353 arbitrary units [AU]/mL). Using a T-cell enzyme-linked immunospot assay, vaccine recipients with evidence of prior infection at baseline (n=21) were found to have strong T-cell responses to spike peptides, whereas responses were significantly weaker among infection-naïve vaccine recipients (n=30). 24 (50%) of 48 all recipients generated responses that could be considered negative.

Prendecki et al. (Feb 26, 2021). Effect of Previous SARS-CoV-2 Infection on Humoral and T-Cell Responses to Single-Dose BNT162b2 Vaccine. The Lancet. [https://doi.org/10.1016/S0140-6736\(21\)00502-X](https://doi.org/10.1016/S0140-6736(21)00502-X)

- A nested case-control study of 51 health care workers found that anti-S titers 19-29 days after the first dose of the Pfizer/BioNTech vaccine were comparable to peak titers after natural infection. Among those with a previous SARS-CoV-2 infection, vaccination increased anti-S titers more than 140-fold from peak pre-vaccine levels. Prior infection was determined by positive detection of antibodies against the SARS-CoV-2 nucleocapsid or the receptor binding domain of the SARS-CoV-2 S1 subunit of the spike protein.

Manisty et al. (Feb 26, 2021). Antibody Response to First BNT162b2 Dose in Previously SARS-CoV-2-Infected Individuals. The Lancet. [https://doi.org/10.1016/S0140-6736\(21\)00501-8](https://doi.org/10.1016/S0140-6736(21)00501-8)

- *[Pre-print, not peer-reviewed]* A study exploring the timing of protection conferred by the Pfizer/BioNTech vaccine indicated that the vaccine was effective beginning 11 days following the first dose, suggesting that vaccine protection precedes the full development of neutralizing antibodies. In addition, efficacy did not increase following the second dose (compared to the period between day 11 and 28).

Saul et al. (Mar 1, 2021). Reanalysis of the Pfizer mRNA BNT162b2 SARS-CoV-2 Vaccine Data Fails to Find Any Increased Efficacy Following the Boost Implications for Vaccination Policy and Our Understanding of the Mode of Action. Pre-print downloaded Mar 1 from <https://doi.org/10.1101/2021.02.23.21252315>

- *[Pre-print, not peer-reviewed]* In simulations of randomized trials to estimate the effect of vaccination on transmission, one dose of the Moderna vaccine reduced the potential for transmission by at least 61%. The analysis suggested that the impact of a given vaccine on viral positivity should be assessed separately in symptomatic individuals and positive test results obtained cross-sectionally, regardless of symptoms. The approach also suggested that the odds ratio of carriage for vaccine vs. placebo can provide an unbiased estimate of vaccine effectiveness against viral positivity, under certain assumptions, and provide a lower bound for transmissibility.

Lipsitch and Kahn. (Feb 28, 2021). Interpreting Vaccine Efficacy Trial Results for Infection and Transmission. Pre-print downloaded Mar 1 from <https://doi.org/10.1101/2021.02.25.21252415>

Clinical Characteristics and Health Care Setting

- An exploratory analysis of immunization records from the Mayo clinic found that receipt of multiple vaccines within the past five years were associated with protection from SARS-CoV-2 infection. In an analysis of medical records from 137,037 individuals tested for SARS-CoV-2 by PCR, receipt of vaccines for polio, Haemophilus influenzae type-B (HIB), measles-mumps-rubella (MMR), Varicella, pneumococcal conjugate (PCV13), Geriatric Flu, and hepatitis A/hepatitis B (HepA–HepB) were associated with lower rates of SARS-CoV-2 infection. This relationship was maintained even after adjusting for geographic SARS-CoV-2 incidence and testing rates, demographics, comorbidities, and number of other vaccinations. Receipt of another 11 vaccines (typhoid, tetanus, Zoster, rotavirus, PCV23, pediatric flu, meningococcal, live influenza, general influenza, HPV, or geriatric flu) was not associated with SARS-CoV-2 infection.

Pawlowski et al. (Dec 26, 2021). Exploratory Analysis of Immunization Records Highlights Decreased SARS-CoV-2 Rates in Individuals with Recent Non-COVID-19 Vaccinations. Scientific Reports. <https://doi.org/10.1038/s41598-021-83641-y>

Modeling and Prediction

- Low reproduction numbers can lead to long, thin transmission chains that may span three or more viral generations before a clearly symptomatic case occurs, according to a series of mathematical models developed to assess the impacts of delayed index case identification in the context of SARS-CoV-2. Such chains may be underrepresented in routine surveillance data, which can lead to surveillance “blind spots”. The authors argue that as a result, SARS-CoV-2 case and contact management may be feasible to partially contain transmission, but only in the context of sensitive surveillance systems.

Killeen et al. (Feb 2021). Long, Thin Transmission Chains of Severe Acute Respiratory Syndrome Coronavirus 2 May Go Undetected for Several Weeks at Low to Moderate Reproduction Numbers: Implications for Containment and Elimination Strategy. Infectious Disease Modelling. <https://doi.org/10.1016/j.idm.2021.02.002>

Public Health Policy and Practice

- Only 6 out of the first 50 results using a Google search for “COVID-19 testing” had an appropriate readability score. Of these six, two were deemed appropriate by 3 tests (Flesch-Kincaid Grade Level (FKGL), Gunning Fog Index (GFI), and Coleman-Liau Index (CLI)) and four were deemed appropriate by 2 tests (FKGL and GFI). None of the websites had appropriate readability scores on all five assessments.

Garcia et al. (Feb 27, 2021). Assessing the Readability of Covid-19 Testing Messages on the Internet. Journal of Community Health. <https://doi.org/10.1007/s10900-021-00973-6>

- In the event of combined wildfires and the COVID epidemic, applying restrictive measures, protecting shelter residents, and expanding the healthcare capacity by using non-acute beds could be helpful mitigation strategies according to a modeling study. The study used Butte County, California as a representative community and coupled the 2018 Camp Fire that occurred in Paradise with the current 2020 COVID-19 pandemic. Based upon these inputs, a susceptible exposed infectious removed (SEIR) model combining wildfire and COVID-19 data was used to quantify the collective impacts of such events on healthcare systems and evaluate different strategies for managing patient demand.

Hassan and Mahmoud. (Dec 26, 2021). Orchestrating Performance of Healthcare Networks Subjected to the Compound Events of Natural Disasters and Pandemic. Nature Communications. <https://doi.org/10.1038/s41467-021-21581-x>

Other Resources and Commentaries

- [Emerging Lessons From COVID-19 for the US Clinical Research Enterprise](#) – JAMA (Feb 26)
- [Historical Evidence to Inform COVID-19 Vaccine Mandates](#) – The Lancet (Feb 27)
- [COVID-19 among American Indians and Alaska Natives](#) – The Lancet Infectious Diseases (Mar 1)
- [Saliva Sample for the Massive Screening of SARS-CoV-2 Infection: A Systematic Review](#) – Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology (Feb 1)
- [SARS-CoV-2 Vaccines](#) – JAMA (Feb 26)
- [Covid-19 Vaccine Apps Should Deliver More to Patients](#) – The Lancet Digital Health (Feb 25)
- [How to Test SARS-CoV-2 Vaccines Ethically Even after One Is Available](#) – Clinical Infectious Diseases (Feb 26)
- [Clinical Performance and Analytical Sensitivity of Three SARS-CoV-2 Nucleic Acid Diagnostic Tests](#) – The American Journal of Tropical Medicine and Hygiene (Feb 26)
- [COVID-19, Children and Schools: Overlooked and at Risk](#) – Medical Journal of Australia (Feb 28)
- [Can COVID Spread from Frozen Wildlife? Scientists Probe Pandemic Origins](#) – Nature (Feb 26)
- [Can Social Media Data Be Used to Evaluate the Risk of Human Interactions during the COVID-19 Pandemic](#) – International Journal of Disaster Risk Reduction (Feb 24)
- [Where Did COVID Come from? Five Mysteries That Remain](#) – Nature (Feb 26)
- [Social Distancing for COVID-19 Decreased Infectious Diseases in Children](#) – Journal of Pediatric Nursing (Feb 20)
- [Bell's Palsy and SARS-CoV-2 Vaccines](#) – The Lancet Infectious Diseases (Feb 24)
- [Covid-19 Vaccine Hesitancy among Ethnic Minority Groups](#) – BMJ (Feb 26)
- [Disabled People in the Time of COVID-19: Identifying Needs, Promoting Inclusivity](#) – Journal of Global Health (Jan 1)
- [Feelings towards COVID-19 Vaccination in Africa](#) – The Lancet. Infectious Diseases (Mar 1)
- [Human Challenge Trials to Assess the Efficacy of Currently Approved COVID-19 Vaccines against SARS-CoV-2 Variants](#) – Emerging Microbes & Infections (Feb 26)
- [Community Health Workers and Non-Clinical Patient Navigators: A Critical COVID-19 Pandemic Workforce](#) – Preventive Medicine (Feb 23)
- [An Insight on the Arrangement of a Remote Military COVID-19 Vaccination Site](#) – Military Medicine (Feb 26)
- [New WTO Leader Faces COVID-19 Challenges](#) – Lancet (London, England) (Feb 27)

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