

## 2019-nCoV Literature Situation Report (Lit Rep)

June 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

- **The SARS-CoV-2 B.1.1.7 (Alpha) variant accounted for 66% and the P.1 (Gamma) variant accounted for 5% of US infections during April 11-24, 2021, according to population-weighted CDC estimates. The estimated proportion of B.1.1.7 (Alpha) infections in the region including Washington State was 52%. [More](#)**
- **International travelers fully vaccinated with a COVID-19 mRNA vaccine (n=10,092) had an 87% lower likelihood of testing positive for SARS-CoV-2 via PCR upon arrival to Qatar between February to April 2021 compared to a matched (1:1) cohort of unvaccinated travelers with no prior infection. Over 80% of a subset of PCR-positive specimens sequenced (n=72) were identified as variants of concern. [More](#)**

### Geographic Spread

- During April 11-24, 2021, the SARS-CoV-2 B.1.1.7 (Alpha) variant accounted for an estimated 66% of US infections and the P.1 (Gamma) variant accounted for 5% of US infections, according to the CDC. Estimates are based on sequencing of 25,000 SARS-CoV-2-positive specimens, representing 3% of all reported positive tests and weighted to the general population. Estimated proportions of B.1.1.7 (Alpha) infections varied by Department of Health and Human Services (HHS) geographic regions. B.1.1.7 (Alpha) infections represented 52% of infections in HHS region 10, which includes Washington State.

*Paul et al. (June 11, 2021). Genomic Surveillance for SARS-CoV-2 Variants Circulating in the United States, December 2020–May 2021. MMWR. <https://doi.org/10.15585/mmwr.mm7023a3>*

### Vaccines and Immunity

- Median anti-SARS-CoV-2 neutralizing antibody titers of sera from individuals vaccinated with the Johnson & Johnson-Janssen vaccine in the phase 1/2 trials (n=20) were 5- and 3-fold lower against the B.1.351 (Beta) and P.1 (Gamma) variants, respectively, compared with the wild-type strain on day 71 following vaccination. Binding antibody titers were impaired but to a lesser extent, with a 3-fold reduction against both variants compared to the wild-type strain. By contrast, functional non-neutralizing antibody responses and T-cell responses were largely preserved against the variants.

*Alter et al. (June 9, 2021). Immunogenicity of Ad26.COV2.S Vaccine against SARS-CoV-2 Variants in Humans. Nature. <https://doi.org/10.1038/s41586-021-03681-2>*

- Travelers fully vaccinated with a COVID-19 mRNA vaccine (n=10,092) had an 87% lower likelihood of having a positive SARS-CoV-2 PCR test upon arrival at Hamad International Airport in Qatar between February and April 2021 compared to travelers with no record of vaccination or prior infection matched 1:1 by age, sex, nationality, and date of testing (PCR positivity 0.8% vs 3.7%). Similarly, travelers with a record of prior infection (n=7,694) matched 1:1 to the same cohort of unvaccinated and infection-naïve travelers had an 84% lower likelihood of having a positive PCR test (PCR positivity 1.0% vs 3.8%). Over 80% of PCR-positive sequenced specimens (n=72) were identified as variants of concern, with 44% identified as the B.1.351 (Beta) variant, 28% as the B.1.1.7 (Alpha) variant, and 11% as B.1.617 (Delta) variant.

*Bertollini et al. (June 9, 2021). Associations of Vaccination and of Prior Infection With Positive PCR Test Results for SARS-CoV-2 in Airline Passengers Arriving in Qatar. JAMA.*

<https://doi.org/10.1001/jama.2021.9970>

- Vaccine-elicited anti-SARS-CoV-2 antibodies in individuals fully vaccinated with the Moderna vaccine in phase 1/2 trials (n=14) were found to target more epitopes within the receptor binding domain (RBD) when compared to individuals with prior infection. Binding of vaccine-elicited antibodies was more broadly distributed across epitopes compared to infection-elicited antibodies within the RBD, which the authors suggest indicates that single mutations in the RBD are less likely to escape neutralizing activity induced by vaccines than by prior infection.

*Greaney et al. (June 8, 2021). Antibodies Elicited by mRNA-1273 Vaccination Bind More Broadly to the Receptor Binding Domain than Do Those from SARS-CoV-2 Infection. Science Translational Medicine. <https://doi.org/10.1126/scitranslmed.abi9915>*

- *[Pre-print, not peer-reviewed]* AX290 and AX677 (AXON Neuroscience), second generation monoclonal antibodies developed specifically to target SARS-CoV-2 variants of concern, were experimentally shown to successfully neutralize the wild-type strain, B.1.1.7 (Alpha), and B.1.351 (Beta) in mouse models.

*Kovacech et al. (June 9, 2021). Second Generation Antibodies Neutralize Emerging SARS-CoV-2 Variants of Concern. Pre-print downloaded Jun 10 from*

<https://doi.org/10.1101/2021.06.09.447527>

- Prioritization of individuals aged  $\geq 65$  years in Washington State for COVID-19 vaccination in January 2021 resulted in an estimated 434 fewer hospitalizations and 122 fewer deaths through March 2021 according to an analysis that compared actual age-specific COVID-19 hospitalization and fatality rates with a synthetic control group generated from a model based on age-specific COVID-19 hospitalization and fatality rates from March 2020 to January 2021.

*Lavista Ferres et al. (June 9, 2021). Association of COVID-19 Vaccination Prioritization and Hospitalization among Older Washingtonians. Journal of the American Geriatrics Society.*

<https://doi.org/10.1111/jgs.17315>

- *[Pre-print, not peer-reviewed]* Anti-SARS-CoV-2 antibody binding responses among individuals 29 days after vaccination with the single-dose Johnson & Johnson-Janssen vaccine (n=88) were reduced by 1.8-fold against the B.1.351 (Beta) variant compared to the wild-type D614G strain. By contrast, 82% in a subset of 27 individuals showed no neutralizing activity against B.1.351

(Beta) at Day 29 compared to 4% against the wild-type strain. Geometric mean neutralizing titers were also 3-fold lower against B.1.351 (Beta). The authors conclude that, given the comparable efficacy of the vaccine against the wild-type and B.1.351 (Beta) variants, these data suggest that even low levels of neutralizing antibodies may contribute to protection from moderate/severe disease.

Moore et al. (June 9, 2021). *Neutralizing Antibodies Elicited by the Ad26.COV2.S COVID-19 Vaccine Show Reduced Activity against 501Y.V2 (B.1.351) despite Protection against Severe Disease by This Variant*. Pre-print downloaded Jun 10 from <https://doi.org/10.1101/2021.06.09.447722>

- [Pre-print, not peer-reviewed] The Pfizer-BioNTech vaccine only elicited a short-lived mucosal IgA antibody response in a study of 108 vaccinated healthcare workers (HCWs) in Italy without prior infection, with none of the vaccinated HCWs tested for mucosal IgA having a detectable response 2-3 weeks after the second dose. By contrast, the vaccine elicited robust memory B cell responses that were highly specific to SARS-CoV-2 up to 3 months after the first dose, including IgA-secreting memory B cells.

Mortari et al. (June 9, 2021). *Highly-Specific Memory B Cells Generation after the 2nd Dose of BNT162b2 Vaccine Compensate for the Decline of Serum Antibodies and Absence of Mucosal IgA*. Pre-print downloaded Jun 10 from <https://doi.org/10.1101/2021.06.08.21258284>

## Clinical Characteristics and Health Care Setting

- COVID-19 patients with extended viral shedding for >45 days (n=12) had lower levels of inflammatory cytokines/chemokines (IL-2, TNF, and LT- $\alpha$ ) compared to an age- and sex-matched cohort of COVID-19 patients in whom viral shedding resolved within 21 days (n=39). Single-cell RNA sequencing from peripheral mononuclear blood cells from a subset of patients showed suppressed T cell responses and reduced expression of ribosomal protein genes in patients with extended viral shedding.

Yang et al. (June 9, 2021). *Clinical and Molecular Characteristics of COVID-19 Patients with Persistent SARS-CoV-2 Infection*. *Nature Communications*. <https://doi.org/10.1038/s41467-021-23621-y>

## Modeling and Prediction

- A SARS-CoV-2 transmission model incorporating social behavioral changes in response to infection rates and vaccination rates suggests that a large increase in the sense of safety and a lowering of precautions due to vaccination to pre-pandemic levels could result in a surge of infections. However, the model predicted that new infections rates could approach zero by August 2021 in the US, based on an observed rate of vaccination of 0.3% of the population per day. Alternatively, slower vaccination rollout (0.1%/day) combined with behavioral changes due to a high sense of safety could lead to a substantial rise in cases. The model accurately reproduced COVID-19 case data from April 2020 to January 2021 in 6 US populations, including New York City, California, and Massachusetts.

Usherwood et al. (June 8, 2021). *A Model and Predictions for COVID-19 Considering Population Behavior and Vaccination*. *Scientific Reports*. <https://doi.org/10.1038/s41598-021-91514-7>

- A model optimizing COVID-19 vaccine allocation calibrated to Washington State found that with high single-dose efficacy (>65%) and low baseline transmission, single-dose vaccination in all adults is optimal and can prevent up to 22% more deaths compared to a strategy prioritizing

two-dose vaccination for older adults. However, under low single-dose efficacy (20%) and high transmission scenarios, two-dose vaccination prioritizing older adults can prevent up to 41% more deaths compared to single-dose vaccination in all adult populations. [EDITORIAL NOTE: A pre-print related to this manuscript was summarized on January 6, 2021.] Matrajt et al. (June 8, 2021). *Optimizing Vaccine Allocation for COVID-19 Vaccines Shows the Potential Role of Single-Dose Vaccination*. *Nature Communications*. <https://doi.org/10.1038/s41467-021-23761-1>

## Public Health Policy and Practice

- [Pre-print, not peer-reviewed] An online survey of unvaccinated US adults about the pause in the use of the Johnson & Johnson-Janssen vaccine conducted in April 2021 (n=557) found that respondents tended to overestimate the number of cases of cerebral venous sinus thrombosis (CVST). When asked to guess a specific number after reading web materials mentioning “a small number of reports” of CVST in vaccinated individuals, 58% of respondents estimated 100 or more cases (actual value is 6 cases at the time of the study). Additionally, 48% of respondents indicated that the pause reduced their confidence in vaccine safety. Mishra and Dexter. (June 9, 2021). *Response of Unvaccinated US Adults to Official Information About the Pause in Use of the Johnson & Johnson-Janssen COVID-19 Vaccine*. Pre-print downloaded Jun 10 from <https://doi.org/10.1101/2021.06.08.21258558>
- Routine childhood and adolescent vaccination decreased substantially during March to May 2020 in 10 US jurisdictions with high-performing immunization information systems, including Washington State, compared to 2018 and 2019 levels. Across all jurisdictions, the most substantial declines were observed for HPV vaccinations among children aged 13-17 years (73%), Tdap among children aged 9-12 years (63%), and HPV among children aged 9-12 years (63%). Although administered doses increased during June-September 2020 after statewide lockdowns were relaxed, this increase was not sufficient to achieve catch-up coverage. The CDC recommends that providers consider co-administering COVID-19 vaccines with other routinely recommended vaccines as COVID-19 vaccinations become readily available to pediatric populations. Murthy et al. (June 11, 2021). *Impact of the COVID-19 Pandemic on Administration of Selected Routine Childhood and Adolescent Vaccinations — 10 U.S. Jurisdictions, March–September 2020*. *MMWR*. <https://doi.org/10.15585/mmwr.mm7023a2>

## Other Resources and Commentaries

- [Mitigating Airborne Transmission of SARS-CoV-2](#) – Canadian Medical Association Journal (June 8)
- [The Importance of Time Post-Vaccination in Determining the Decrease in Vaccine Efficacy against SARS-CoV-2 Variants of Concern](#) – MedRxiv (June 9)
- [Identifying and Tracking SARS-CoV-2 Variants — A Challenge and an Opportunity](#) – New England Journal of Medicine (June 9)
- [US Ventilator Allocation and Patient Triage Policies in Anticipation of the COVID-19 Surge](#) – Health Security (June)
- [An Outbreak of SARS-CoV-2 with High Mortality in Mink \(Neovison Vison\) on Multiple Utah Farms](#) – BioRxiv (June 10)
- [Multisystem Inflammatory Syndrome in Children \(MISC\): A Systematic Review](#) – International Journal of Clinical Practice (June)

- [Molecular Evidence of SARS-CoV-2 in New York before the First Pandemic Wave](#) – Nature Communications (June)
- [Covid-19: Tests Must Be More Rigorously Regulated to Protect Public, Say Statisticians](#) – BMJ (June)
- [Country-Wide Genomic Surveillance of SARS-CoV-2 Strains](#) – BioRxiv (June 9)
- [Operationalizing a Routine Wastewater Monitoring Laboratory for SARS-CoV-2](#) – MedRxiv (June 9)
- [Emerging Science, Personal Protective Equipment Guidance, and Resource Scarcity: Inaction and Inequity for Workers in Essential Industries](#) – Health Security (June 9)
- [China Is Vaccinating a Staggering 20 Million People a Day](#) – Nature (June 9)
- [Association of Smartphone Ownership and Internet Use With Markers of Health Literacy and Access: Cross-Sectional Survey Study of Perspectives From Project PLACE \(Population Level Approaches to Cancer Elimination\)](#) – Journal of Medical Internet Research (June)
- [Opinion: How to Ensure Regulations Don't Stymie Much-Needed COVID-19 Point-of-Care Testing](#) – Proceedings of the National Academy of Sciences (June 15)
- [Changing Landscapes of Death and Burial Practices: Public Health Response in Time of COVID-19 Pandemic](#) – Journal of Public Health (June 7)
- [COVID-19 Conscience Tracing: Mapping the Moral Distances of Coronavirus](#) – Journal of Medical Ethics (June)
- [The ChAdOx1 Vectored Vaccine AZD2816 Induces Strong Immunogenicity against SARS-CoV-2 B.1.351 and Other Variants of Concern in Preclinical Studies](#) – BioRxiv (June 9)
- [Post-COVID Symptoms Reported at Asynchronous Virtual Review and Stratified Follow-up after COVID-19 Pneumonia](#) – Clinical Medicine (June 8)
- [Network Medicine Links SARS-CoV-2/COVID-19 Infection to Brain Microvascular Injury and Neuroinflammation in Dementia-like Cognitive Impairment](#) – Alzheimer's Research & Therapy (Dec 9)

*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*