

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 effectiveness of the Pfizer vaccine 7 or more days after the second dose was 92% against documented SARS-CoV-2 infection, 87% against hospitalization, and 92% in preventing severe disease in an observational study. [More](#)**
- **The SARS-CoV-2 B.1.351 variant was associated with lower geometric mean neutralizing titers in sera from patients infected with the B.1.1.7 variant, and from patients receiving 2-doses of the Pfizer and Oxford-AstraZeneca vaccines compared to titers against an early SARS-CoV-2 isolate. Additionally, the B.1.351 variant was shown to escape the monoclonal antibody casirivimab (773-fold reduction in neutralization titers), one of the Regeneron monoclonal antibody therapies. [More](#)**
- **SARS-CoV-2 reinfection was suspected in a skilled nursing facility in Kentucky, where 5 residents received positive RT-PCR test results in two separate COVID-19 outbreaks separated by 3 months with at least four negative test results from each resident between outbreaks. Severity of disease among potentially reinfected patients was worse in the second outbreak than the first outbreak, and included one death. [More](#)**

Transmission

- *[Pre-print, not peer-reviewed]* The prevalence of SARS-CoV-2 isolates with the E484K mutation, a key mutation of the B.1.351 variant, rose from 1.3% to 12.3% between November 2020 to mid-February 2021 in New York City. In a subset of 65 samples suspected to contain key mutations, 49 fell within a single novel lineage (B.1.526) characterized by a common set of spike protein mutations, including E484K. Investigation of SARS-CoV-2 sequences in public databases found approximately 140 genomes sampled throughout the Northeastern US that were highly related to the B.1.526 variant, suggesting the variant may already be widespread in the region.
Annavajhala et al. (Feb 25, 2021). A Novel SARS-CoV-2 Variant of Concern B.1.526 Identified in New York. Pre-print downloaded Feb 25 from <https://doi.org/10.1101/2021.02.23.21252259>
- *[Pre-print, not peer-reviewed]* Environmental samples (n=224) collected from COVID-19 patient serving and staff congregation areas in a university hospital in California between April and August 2020 identified 11 samples positive for SARS-CoV-2 RNA, with a smaller proportion of positive samples (2% vs 11%) detected over time as improved cleaning and patient management practices were implemented. None of the samples were capable of infectivity based on cell culture. Genomic sequencing of positive samples showed that some had near-complete genome sequences which

suggest that RNA in the samples were either not associated with intact virions, or they were present in insufficient numbers for infectivity.

Coil et al. (Feb 24, 2021). SARS-CoV-2 Detection and Genomic Sequencing from Hospital Surface Samples Collected at UC Davis. Pre-print downloaded Feb 25 from <https://doi.org/10.1101/2021.02.23.21252022>

- *[Pre-print, not peer-reviewed]* A population-wide study in Ontario, Canada including nearly 85,000 household contacts from nearly 30,000 households between July to November 2020 found that, while the overall household secondary attack rate (SAR) for SARS-CoV-2 transmission was 20%, 12% of households had a SAR $\geq 75\%$. Households in which the index case was symptomatic and had longer delays between symptom onset and test seeking were more likely to have a higher SAR; each day of delay in testing after symptom onset was associated with a 1.8% increase in SAR. The SAR was similar by household size, but the SAR was greater in larger households in the most ethnically diverse neighborhoods compared to those in the least ethnically diverse neighborhoods (20% vs 15%).
Tibebu et al. (Feb 25, 2021). Household Secondary Attack Rate of COVID-19 by Household Size and Index Case Characteristics. Pre-print downloaded Feb 25 from <https://doi.org/10.1101/2021.02.23.21252287>

Vaccines and Immunity

- SARS-CoV-2 reinfection is suspected among residents of a skilled nursing facility in Kentucky, where 5 residents received positive RT-PCR test results in two separate COVID-19 outbreaks separated by 3 months with at least four negative test results for each resident in between the outbreaks. While only 2 of 5 patients had symptomatic infection during the first outbreak, all 5 had symptomatic infection during the second outbreak. The two patients who had symptomatic infection during the first outbreak experienced worse symptoms. Samples were not stored, and therefore it was not possible to confirm reinfection with genomic sequencing.
Cavanaugh et al. (Feb 26, 2021). Suspected Recurrent SARS-CoV-2 Infections Among Residents of a Skilled Nursing Facility During a Second COVID-19 Outbreak — Kentucky, July–November 2020. MMWR. Morbidity and Mortality Weekly Report. <https://doi.org/10.15585/mmwr.mm7008a3>
- In an observational study of the mass vaccination campaigns in Israel, real world effectiveness of the Pfizer vaccine 7 or more days after the second dose was 92% for documented SARS-CoV-2 infection, 94% for symptomatic infection, 87% for hospitalization, and 92% for severe disease. The study included 596,618 individuals matched to unvaccinated controls in a 1:1 ratio according to demographic and clinical characteristics.
- Vaccine effectiveness between 14 and 20 days after the first dose was 46%, 57%, 74%, 62%, and 72% in preventing any documented SARS-CoV-2 infection, symptomatic infection, hospitalization, severe disease, and death, respectively.
- The estimated vaccine effectiveness in preventing any infection among studied sub-populations was consistent across age groups, with potentially lower effectiveness in individuals with multiple co-existing conditions.
Dagan et al. (Feb 24, 2021). BNT162b2 mRNA Covid-19 Vaccine in a Nationwide Mass Vaccination Setting. New England Journal of Medicine. <https://doi.org/10.1056/NEJMoa2101765>
- In a cohort study of over 3.2 million US patients with a SARS-CoV-2 antibody test result (88% negative), the ratio of seropositive to seronegative patients with a positive SARS-CoV-2 nucleic acid amplification test (NAAT) decreased from 3% within 30 days of the antibody test to 0.1% after at least 90 days following the antibody test. Among seropositive patients, 18% converted to seronegative over the follow-up period. The authors suggest that a higher likelihood of NAAT

positivity among seropositive patients is consistent with prolonged viral RNA shedding, but that seroconversion may reduce future risk of SARS-CoV-2 infection.

Harvey et al. (Feb 24, 2021). Association of SARS-CoV-2 Seropositive Antibody Test With Risk of Future Infection. *JAMA Internal Medicine*. <https://doi.org/10.1001/jamainternmed.2021.0366>

- Neutralizing antibody titers were lower in assays against the SARS-CoV-2 B.1.351 variant compared to an early isolate from Wuhan across several sample sources. The geometric mean neutralizing titers were lower by 13.3-fold in convalescent plasma from patients infected during the first wave in the UK (n=34), by 3.1-fold in sera from patients infected with the B.1.1.7 variant (n=13), by 7.6-fold in sera from Pfizer vaccine recipients 14-28 days after the 2nd dose (n=25), and by 9-fold in sera from Oxford-AstraZeneca vaccine recipients 4-17 days after the 2nd dose (n=25).
- In a panel of 377 monoclonal antibodies (mAbs) raised from convalescent sera of first-wave patients in the UK, 14 out of the 20 of the most potent mAbs had a greater than 10-fold reduction in neutralization titers. In the mAb-based treatments from Regeneron and AstraZeneca, one of the Regeneron mAb pairs (casirivimab) had up to a 773-fold reduction in neutralization titers, while both of the AstraZeneca mAbs had little to no reduction.
- Structure-function analysis suggests that the mechanism by which the B.1.351 variant escapes neutralization and provides tighter binding to the angiotensin-converting enzyme-2 (ACE2) receptor to more efficiently enter human cells is primarily driven by the E484K mutation.

Zhou et al. (Feb 17, 2021). Evidence of Escape of SARS-CoV-2 Variant B.1.351 from Natural and Vaccine Induced Sera. *Cell*. <https://doi.org/10.1016/j.cell.2021.02.037>

Clinical Characteristics and Health Care Setting

- In a nationwide case series of 1116 patients <21 years between March and October 2020, 539 were diagnosed with multisystem inflammatory syndrome in children (MIS-C) and 577 were diagnosed with COVID-19. Patients with MIS-C were more likely to be 6-12 years old (41% vs 19%), non-Hispanic Black (32% vs 22%), and have severe cardiovascular symptoms than respiratory symptoms (56% vs 9%) than COVID-19 patients. A higher proportion of MIS-C patients were admitted to the ICU (74% vs 44%), and a similar proportion died during hospitalization (1.9% vs 1.4%).

Feldstein et al. (Feb 24, 2021). Characteristics and Outcomes of US Children and Adolescents With Multisystem Inflammatory Syndrome in Children (MIS-C) Compared With Severe Acute COVID-19. *JAMA*. <https://doi.org/10.1001/jama.2021.2091>

- A retrospective study among pediatric patients in Alabama (n=111, age ≤22 years) identified 100 patients with COVID-19 and 11 with multisystem inflammatory syndrome in children (MIS-C). Fever, rash, conjunctivitis, and gastrointestinal symptoms were more common in the MIS-C patients, while COVID-19 patients more commonly presented with respiratory symptoms. Patients were more likely to be males in all severity categories of both diseases, and Black and Hispanic patients were overrepresented compared to the pediatric population of Alabama.

Reiff et al. (Feb 24, 2021). Distinguishing Active Pediatric COVID-19 Pneumonia from MIS-C. *Pediatric Rheumatology*. <https://doi.org/10.1186/s12969-021-00508-2>

Other Resources and Commentaries

- [Symptoms of Anxiety and Depression in Relation to Work Patterns during the First Wave of the COVID-19 Epidemic in Philadelphia PA a Cross-Sectional Survey](#) – MedRxiv (Jan 22)
- [Persistence of Antibodies to SARS-CoV-2 in Relation to Symptoms in a Nationwide Prospective Study](#) – Clinical Infectious Diseases (Feb 24)

- [Online Mis/Disinformation and Vaccine Hesitancy in the Era of COVID-19: Why We Need an EHealth Literacy Revolution](#) – Human Vaccines & Immunotherapeutics (Feb 24)
- [First-Dose COVID-19 Vaccination Coverage Among Skilled Nursing Facility Residents and Staff](#) – JAMA (Feb 24)
- [Preventive Behaviors and Mental-Health Related Symptoms among Immunocompromised Adults during the COVID-19 Pandemic: An Analysis of the COVID Impact Survey](#) – AIDS Research and Human Retroviruses (Feb 25)
- [Massive Google-Funded COVID Database Will Track Variants and Immunity](#) – Nature (Feb 24)
- [Medical Experimentation and the Roots of COVID-19 Vaccine Hesitancy among Indigenous Peoples in Canada](#) – Canadian Medical Association Journal (Feb 24)
- [Aerosol Transmission of SARS-CoV-2 by Children and Adults During the COVID-19 Pandemic](#) – Pediatric Pulmonology (Feb 24)
- [The Response Measures to the Coronavirus Disease 2019 Outbreak in China](#) – Open Forum Infectious Diseases (Feb 1)
- [The Effects of Wearing Facemasks on Oxygenation and Ventilation at Rest and during Physical Activity](#) – PLOS ONE (Feb 24)

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