

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

- **Mutations in three main epitopes of the SARS-CoV-2 spike receptor-binding domain (RBD) affect neutralizing activity of convalescent serum. Mutations occurring at the E484 site had the biggest average effect with a >10-fold reduction in serum neutralization in some donors. The impact of specific viral mutations on neutralization varied substantially across individuals and within the same individual over time, with no mutation completely eliminating neutralizing activity.** [More](#)
- **A systematic review and meta-analysis that included 126 studies and surveys showed COVID-19 vaccine acceptance declined from >70% in March 2020 to <50% in October 2020.** [More](#)
- **SARS-CoV-2 spread rapidly in a detention facility in Louisiana. A cohort of detained persons who were tested using PCR on nasal swabs had a 78% cumulative incidence of SARS-CoV-2 infection. 89% of persons in one dormitory who were negative upon initial testing were later found to have detectable virus.** [More](#)
- **A laboratory experiment simulating a reduced occupancy classroom suggests that room ventilation up to 10 air exchanges per hour would not reduce infection probabilities below 1% in the context of SARS-CoV-2 exposure via airborne transmission for over an hour, but the addition of face coverings with moderate to high filtration efficiency used by all individuals could reduce infection probabilities to 0.1% or <0.01%.** [More](#)

### Non-Pharmaceutical Interventions

- *[Pre-print, not peer reviewed]* A laboratory experiment simulating a reduced occupancy classroom with aerosolized salt as a surrogate for potential SARS-CoV-2 airborne transmission suggests that good ventilation with up to 10 air exchanges per hour was not enough to achieve an infection probability of less than 1% following exposure for over an hour. However, use of face coverings with moderate to high filtration efficiency by all individuals in the room could reduce infection probabilities to 0.1% or <0.01%.  
*Rothamer et al. (Jan 4, 2021). Strategies to Minimize SARS-CoV-2 Transmission in Classroom Settings Combined Impacts of Ventilation and Mask Effective Filtration Efficiency. Pre-print downloaded Jan 5 from <https://doi.org/10.1101/2020.12.31.20249101>*
- *[Pre-print, not peer reviewed]* A prospective study (n=41) in the UK found that at-home oximetry monitoring could be predictive of hospital admission. Monitoring identified 9 participants whose SpO<sub>2</sub> dropped ≤94%, of which three dropped ≤92% and were admitted to the hospital. The mean maximum reduction in SpO<sub>2</sub> was 2.8%, and the average time to maximum SpO<sub>2</sub> was 6.4 days.

Wilcock et al. (Jan 4, 2021). What Is the Value of Community Oximetry Monitoring in People with SARS-CoV-2 A Prospective Open-Label Clinical Study. Pre-print downloaded Jan 5 from <https://doi.org/10.1101/2021.01.03.21249168>

## Transmission

- A cohort investigation in a detention facility in Louisiana identified rapid transmission and high cumulative incidence of SARS-CoV-2 infection among quarantined inmates. Among 143 persons in 6 quarantined dormitories tested using serial nasal swabs, 53 were PCR positive at initial testing and an additional 58 persons tested positive at later time points (cumulative incidence 78%). In 1 dormitory where all 45 detained persons were PCR negative at initial testing, 40 (89%) were positive 18 days later. Among persons who tested positive, 47% (52/111) had asymptomatic infection at the time of testing.

Wallace et al. (Jan 4, 2021). Rapid Transmission of Severe Acute Respiratory Syndrome Coronavirus 2 in Detention Facility, Louisiana, USA, May–June, 2020. *Emerging Infectious Diseases*. <https://doi.org/10.3201/eid2702.204158>

## Testing and Treatment

- A study assessing the performance of at-home self-collected saliva and nasal-opharyngeal (NOP) swabs for SARS-CoV-2 testing (RT-PCR) among patients who met the criteria for suspected COVID-19 identified 70 out of 201 patients with positive samples from saliva, NOP, or both swabs. 37/70 (53%) were positive in both swabs, 18/70 (26%) were positive in saliva swabs only, and 21/70 were positive in NOP swabs only.

Braz-Silva et al. (Jan 1, 2021). Performance of At-Home Self-Collected Saliva and Nasal-Oropharyngeal Swabs in the Surveillance of COVID-19. *Journal of Oral Microbiology*. <https://doi.org/10.1080/20002297.2020.1858002>

## Vaccines and Immunity

- [Pre-print, not peer reviewed] Mutations in three main epitopes of the SARS-CoV-2 spike receptor-binding domain (RBD) affect neutralizing activity of convalescent polyclonal serum. Mutations that affect neutralizing activity usually occur at only a few sites and mutations occurring at the E484 site had the largest average effect with a >10 fold reduction in the neutralization activity from some donors. This mutation has been described in recent lineages from South Africa. Of note, the authors found substantial variation in the impact of mutations on the neutralization potential of polyclonal serum both between individuals and within the same individual over time. No mutations eliminated neutralization.

Greaney et al. (Jan 4, 2021). Comprehensive Mapping of Mutations to the SARS-CoV-2 Receptor-Binding Domain That Affect Recognition by Polyclonal Human Serum Antibodies. Pre-print downloaded Jan 5 from <https://doi.org/10.1101/2020.12.31.425021>

- A systematic review and meta-analysis showed declining COVID-19 vaccine acceptance, from >70% in March to <50% in October. In an analysis of data from 126 studies and surveys, drivers of decline in vaccine acceptance included perceived risk, concerns over vaccine safety and effectiveness, doctors' recommendations, and inoculation history. In assessing the impact of survey design, responses in surveys with more options (e.g., very likely/somewhat likely/neutral/somewhat unlikely/very unlikely, definitely/probably/probably not/definitely not) were more spread out compared to when fewer options were provided (e.g., yes/no/not sure or don't know), which resulted in seemingly lower percentages of affirmative answers. Surveys that included different timings for vaccination showed hesitancy in getting first generation vaccines.

## Clinical Characteristics and Health Care Setting

- Pediatric emergency departments (PEDs) experienced decreases of non-COVID-19 patients and implemented modifications to staffing, workflow and clinical practice. According to a survey of 25 departments, 60% had COVID-19-dedicated units and 32% modified their pediatric patient age to include adults. All PEDs changed their staffing model, with 80% of PEDs implementing changes affecting physicians. 62% reported shortages in PPE. 84% of PEDs changed their airway management protocols. The most common training modalities were video/teleconference (84%) and simulation-based training (72%).

Auerbach et al. (Dec 15, 2020). A National US Survey of Pediatric Emergency Department Coronavirus Pandemic Preparedness. *Pediatric Emergency Care*. <https://doi.org/10.1097/PEC.0000000000002307>

- [Pre-print, not peer reviewed] The Veterans Health Administration COVID-19 (VACO) Index was shown to accurately estimate risk of short-term mortality among a wide variety of patients. The index was validated using 1,307 Yale New Haven Hospital inpatients and over 420,000 Medicare patients and consistently identified those at greatest relative risk of death. The authors suggest it could be used to prioritize patients for vaccination and clinical attention.

King et al. (Jan 4, 2021). Accuracy of the Veterans Health Administration COVID-19 (VACO) Index for Predicting Short-Term Mortality among 1307 Yale New Haven Hospital Inpatients and 427224 Medicare Patients. Pre-print downloaded Jan 5 from <https://doi.org/10.1101/2021.01.01.20249069>

- A cohort study of 5,256 nursing home residents with COVID-19 found that increased age, male sex, and impaired cognitive and physical function were independent risk factors for all-cause 30-day mortality. Residents aged 80-84 years had 1.5-times the risk of death compared to those aged 75-79 years. Women were 31% less likely to die than men. Compared with cognitively intact residents, residents with moderate and severe cognitive impairment had 2.1-times and 2.8-times the risk of death. Compared with residents with no or limited impairment of physical function, those with moderate or severe impairment had 1.5-times and 1.6-times the risk of death.

Panagiotou et al. (Jan 4, 2021). Risk Factors Associated With All-Cause 30-Day Mortality in Nursing Home Residents With COVID-19. *JAMA Internal Medicine*. <https://doi.org/10.1001/jamainternmed.2020.7968>

## Modeling and Prediction

- [Pre-print, not peer reviewed] A dynamic causal model parametrized to the UK population suggests that 15 million people (roughly 50,000 per day) would need to be vaccinated by December 2021 and combined with enhanced contact tracing to achieve a 50% herd immunity threshold. With current rates of contact tracing, 24 million people (36% of the population) would need to be vaccinated to achieve an effective herd immunity of 64%, which was estimated to be necessary to achieve suppression. Without any vaccination, the model predicts a tertiary wave occurring in winter 2021.

Friston et al. (Jan 4, 2021). How Vaccination and Contact Isolation Might Interact to Suppress Transmission of Covid-19 a DCM Study. Pre-print downloaded Jan 5 from <https://doi.org/10.1101/2021.01.03.20248972>

## Public Health Policy and Practice

- Data from COVID-19 contact tracing conducted in a large urban private school system in Chicago show that the attack rate for those participating in in-person learning was lower than working-age adults (0.2% for students and 0.5% for staff, compared to 0.7% for working age adults). Data were collected during August to October 2020, during a plateau in case incidence between Chicago's first and second wave.

*Fricchione et al. (Dec 30, 2020). Data-Driven Reopening of Urban Public Education Through Chicago's Tracking of COVID-19 School Transmission. Journal of Public Health Management and Practice. <https://doi.org/10.1097/PHH.0000000000001334>*

- A tool developed by the Center for Disease Control to measure the United States capacity for responding to public health emergencies (the National Health Security Preparedness Index (NHSPI)) poorly predicted excess COVID-19 mortality rates during the first 6 months of the pandemic. State- and territorial-level excess mortality rates for all 50 states and Puerto Rico was poorly correlated with state- and territorial-level overall NHSPI scores. Each of the six individual domains of the NHSPI (Health Security Surveillance, Community Planning and Engagement, Incident and Information Management, Health Care Delivery, Countermeasure Management, and Environmental and occupational health) also showed a high degree of variance and poor correlation with COVID-19 mortality.

*Keim and Lovallo. (Jan 5, 2021). Validity of the National Health Security Preparedness Index as a Predictor of Excess COVID-19 Mortality. Prehospital and Disaster Medicine. <https://doi.org/10.1017/S1049023X20001521>*

- There was a 41% excess in deaths in the Netherlands during the COVID-19 epidemic. While the excess in deaths recorded during the COVID-19 epidemic were comparable to the 18% excess during a more severe influenza epidemic during 2017-18, the COVID-19 excess deaths occurred in a shorter time frame, were characterized by a higher peak, and were mitigated by non-pharmaceutical interventions.

*van Asten et al. (Jan 4, 2021). Excess Deaths during Influenza and Coronavirus Disease and Infection-Fatality Rate for Severe Acute Respiratory Syndrome Coronavirus 2, the Netherlands. Emerging Infectious Diseases. <https://doi.org/10.3201/eid2702.202999>*

## Other Resources and Commentaries

- [Beyond Age—Improvement of Prognostication Through Physical and Cognitive Functioning for Nursing Home Residents With COVID-19](#) – JAMA Internal Medicine (Jan 4)
- [Nested Pool Testing Strategy for the Reliable Identification of Individuals Infected with SARS-CoV-2](#) – MedRxiv (Jan 4)
- [Artificial Intelligence Model of Drive-Through Vaccination Simulation](#) – International Journal of Environmental Research and Public Health (Dec 31)
- [A Public Health COVID-19 Vaccination Strategy to Maximize the Health Gains for Every Single Vaccine Dose](#) – Annals of Internal Medicine (Jan 5)
- [What Industrial Categories Are Workers at Excess Risk of Filing a Covid-19 Workers' Compensation Claim? A Study Conducted in 11 Midwestern U.S. States.](#) – Journal of Occupational and Environmental Medicine (Dec 31)
- [U.S. COVID-19 Vaccination Challenges Go Beyond Supply](#) – Annals of Internal Medicine (Jan 5)

- [Mental Health Services in a U.S. Prison During the COVID-19 Pandemic](#) – Psychiatric Services (Jan 5)
- [Public Concern About Violence, Firearms, and the COVID-19 Pandemic in California](#) – JAMA Network Open (Jan 4)
- [SARS-CoV-2 Encephalitis Is a Cytokine Release Syndrome: Evidences from Cerebrospinal Fluid Analyses](#). – Clinical Infectious Diseases (Jan 4)
- [When Epidemics Collide: Why People with HIV May Have Worse COVID-19 Outcomes and Implications for Vaccination](#) – Clinical Infectious Diseases (Jan 4)
- [Alternative Dose Allocation Strategies to Increase Benefits From Constrained COVID-19 Vaccine Supply](#) – Annals of Internal Medicine (Jan 5)
- [Addressing COVID-19 Misinformation on Social Media Preemptively and Responsively](#). – Emerging Infectious Diseases (Jan 4)
- [Do School Closures Reduce Community Transmission of COVID-19 A Systematic Review of Observational Studies](#) – MedRxiv (Jan 4)
- [Changes in Abortion in Texas Following an Executive Order Ban During the Coronavirus Pandemic](#) – JAMA (Jan 4)
- [Ways to Support Low-Income, At-Risk Young Children During and After Coronavirus Disease 2019](#) – JAMA Pediatrics (Jan 4)
- [A Preparedness Model for Mother-Baby Linked Longitudinal Surveillance for Emerging Threats](#) – Maternal and Child Health Journal (Jan 4)

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