

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

April 9, 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

- **Among healthcare workers in Great Britain, one dose of the Pfizer-BioNTech COVID-19 vaccine resulted in a 4-fold reduction in asymptomatic SARS-CoV-2 infection  $\geq 12$  days post-vaccination (from 0.8% to 0.2%).** [More](#)
- **A large, retrospective US cohort study of persons hospitalized with SARS-CoV-2 infection (N=503,409) found that in-hospital mortality declined across all age groups between March 1 and November 1, 2020 from 20% to 9%. This finding was not explained by a change in the proportion of hospitalized patients by age, which was fairly stable throughout the study period.** [More](#)
- **A COVID-19 case investigation and contact tracing program managed by the Spirit Lake Tribe in North Dakota provide results within 24 hours for 80% of infected individuals and 78% of uninfected contacts. The community achieved a plateau in the incidence of new cases at a time when the incidence in the rest of the state nearly tripled.** [More](#)

### Non-Pharmaceutical Interventions

- In the Blackfeet Tribal Reservation (Montana), enforcement of stay-at-home orders and mandated use of face coverings in public, with potential fines and jail for noncompliance, were associated with a 33-fold reduction in COVID-19 incidence from its peak of 6.4 cases per 1,000 residents per day on October 5 to 0.2 cases per 1,000 residents per day on November 7, 2020. Montana's stay-at-home order expired on July 31 and the subsequent opening of campgrounds and several community events and gatherings resulted in a 63-fold increase in cases on the Reservation through September. On September 28, the stay-at-home order was re-issued with strict enforcement, after which cases declined.

*Pratt et al. (Apr 9, 2021). Use of Stay-at-Home Orders and Mask Mandates to Control COVID-19 Transmission — Blackfeet Tribal Reservation, Montana, June–December 2020. MMWR.*  
<https://doi.org/10.15585/mmwr.mm7014a3>

### Testing and Treatment

- A large, retrospective US cohort study of persons hospitalized with SARS-CoV-2 infection (N=503,409) found that in-hospital mortality declined across all age groups between March 1 and November 1, 2020 from 20% to 9%. This finding was not explained by a change in the proportion of hospitalized patients by age, which was fairly stable throughout the study period. The authors

suggest that decreased mortality may be due to the adoption of novel effective therapeutics, including remdesivir, and improvements in clinical management of severe COVID-19.

*Finelli et al. (Apr 8, 2021). Mortality Among US Patients Hospitalized With SARS-CoV-2 Infection in 2020. JAMA Network Open. <https://doi.org/10.1001/jamanetworkopen.2021.6556>*

- An evaluation of an elementary school-based testing program for school contacts of persons with laboratory-confirmed SARS-CoV-2 infection in Salt Lake County, UT (N=856) found that students of White, Hispanic and other racial minority groups and those residing in zip codes with higher SARS-CoV-2 prevalence were more likely to consent to testing. No differences were found based on grade level, close contact with the index patient, having a family member ever receive a positive SARS-CoV-2 test result, cumulative school incidence, number of recent school cases, number of days from exposure to first contact or to testing, ZIP code–level deprivation score, or ZIP code–level mask compliance. The authors hypothesize that the sociodemographic differences in testing may reflect differences in access to testing outside of the school setting or differing levels of concern about COVID-19 between these groups.

*Lewis et al. (Apr 7, 2021). Factors Associated with Participation in Elementary School–Based SARS-CoV-2 Testing — Salt Lake County, Utah, December 2020–January 2021. MMWR. <https://doi.org/10.15585/mmwr.mm7015e1>*

- A study of a newly developed ultra-sensitive assay for detection of SARS-CoV-2 (S-PLEX, MesoScale Diagnostics) in upper respiratory samples (N=450) with a cycle threshold <35 (higher concentration of virus) demonstrated 95-98% positive agreement and 93-96% negative agreement with RT-PCR. This study confirmed the findings of a previous study of the assay that was performed on frozen, stored samples. Advantages of S-PLEX include the ability to perform high-throughput testing, which can expedite testing in high-volume or surge settings, and provides another option for sensitive testing in settings where molecular testing supplies are scarce. However, the relatively lower negative agreement with RT-PCR suggests confirmatory testing may be required for samples with low-positive antigen levels.

*Wang et al. (Apr 8, 2021). Ultra-Sensitive Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Antigen Detection for the Diagnosis of Coronavirus Disease 2019 (COVID-19) in Upper Respiratory Samples. Clinical Infectious Diseases. <https://doi.org/10.1093/cid/ciab063>*

- As of March 17, 2021, a total of 899 (49%) of 1,849 public and private nonprofit 4-year U.S. colleges and universities provided some type of COVID-19 testing for asymptomatic students. A total of 548 (30%) institutions conducted classes in-person or in a hybrid format. At 389 (43%) institutions there were protocols that required periodic testing for various subgroups (e.g., athletes and a random sample of students), and 287 (32%) institutions mandated that all students receive regular testing, which did not vary between public and private institution or by mode of instruction. 18% (338 of 1,849) of institutions did not mention a COVID-19 testing protocol on their websites, including 146 with in-person or hybrid instruction. A majority (950; 51%) of institutions did not publish a testing protocol for screening asymptomatic students in spring 2021.

*CDC. (Apr 9, 2021). COVID-19 Stats: College and University COVID-19 Student Testing Protocols, by Mode of Instruction (N = 1,849) — United States, Spring 2021. MMWR. <https://doi.org/10.15585/mmwr.mm7014a5>*

## Vaccines and Immunity

- A study of health care workers (N≈9,000) employed at Cambridge University Hospitals in Great Britain found that 1 dose of the Pfizer-BioNTech COVID-19 vaccine was associated with a 4-fold reduction in asymptomatic SARS-CoV-2 infection ≥12 days post-vaccination, from 0.8% to 0.2% [EDITORIAL NOTE: This is equivalent to a 75% vaccine efficacy]. Additionally, the median cycle threshold value of positive tests among those who became infected showed a non-significant increasing trend of higher viral loads among unvaccinated HCWs compared to HCWs ≥12 days post-vaccination, potentially indicating that vaccinated individuals who subsequently become infected may have lower viral loads. The authors suggest that mass first-dose vaccination may reduce SARS-CoV-2 transmission.

Jones et al. (Apr 8, 2021). Single-Dose BNT162b2 Vaccine Protects against Asymptomatic SARS-CoV-2 Infection. *ELife*. <https://doi.org/10.7554/eLife.68808>

- A study of kidney transplant recipients receiving belatacept (N=101), a drug to prevent organ rejection, found that humoral and T-cell immune response to the Pfizer-BioNTech vaccine was low. Only 2 patients developed spike antibodies 28 days after the first dose and 2 of 35 patients tested one month after the 2<sup>nd</sup> dose developed antibodies. A specific T-cell response was observed in only 2 of 40 patients tested 28 days after the first dose and in 7 of 23 patients tested 1 month after the 2<sup>nd</sup> dose. The authors recommend that kidney transplant recipients receiving belatacept should continue to maintain distancing and masking and household members should be vaccinated to maintain protection against COVID-19.

Chavarot et al. (Apr 8, 2021). Poor Anti-SARS-CoV-2 Humoral and T-Cell Responses After 2 Injections of mRNA Vaccine in Kidney Transplant Recipients Treated with Belatacept. *Transplantation*. <https://doi.org/10.1097/TP.0000000000003784>

## Clinical Characteristics and Health Care Setting

- A systematic review (42 studies) and meta-analysis (11 studies) estimated a pooled mean incubation period for COVID-19 of 6.2 days. The authors note that many studies estimated a 95th percentile for incubation periods of up to 16 days, which they suggest may indicate that longer incubation periods should be considered when recommending quarantine and isolation periods for persons exposed to SARS-CoV-2.

Dhouib et al. (Dec 8, 2021). The Incubation Period during the Pandemic of COVID-19: A Systematic Review and Meta-Analysis. *Systematic Reviews*. <https://doi.org/10.1186/s13643-021-01648-y>

- A single-center study of singleton births to mothers without SARS-CoV-2 infection who were residents of New York City (N=43,963) found that changes in the rate of preterm births and neonatal intensive care unit (NICU) admissions in the 3 months before and after the stay-at-home orders in response to the COVID-19 pandemic were issued were not statistically different from changes during the same time periods for the years 2012 to 2019. However, preterm births and NICU admissions decreased significantly after the phase one reopening on June 8, 2020. The authors suggest these decreases may reflect changes in obstetric care and availability of health services, reduced exposure to non-COVID-19 infections, better air quality, and increased hygienic practices.

Richter et al. (Apr 7, 2021). Neonatal Outcomes during the COVID-19 Pandemic in New York City. *Pediatric Research*. <https://doi.org/10.1038/s41390-021-01513-7>

## Mental Health and Personal Impact

- A study of US veterans found that during that pandemic, some veterans experienced positive psychological changes, most notable related to increases in appreciation of life, relating to others, and personal strength. A longitudinal study of US Veterans (N=3,078) found that 43% of respondents reported increased levels of post-traumatic growth (PTG) in November/December 2020, 1-year after a baseline survey. In particular, respondents reported increases in appreciation of life, relating to others, and personal strength. Higher PTG was associated with COVID-19-related post-traumatic stress disorder, and greater appreciation of life and improved social relationships were associated with a reduction in suicidal ideation.

*Pietrzak et al. (Apr 8, 2021). Association of Symptoms of Posttraumatic Stress Disorder With Posttraumatic Psychological Growth Among US Veterans During the COVID-19 Pandemic. JAMA Network Open. <https://doi.org/10.1001/jamanetworkopen.2021.4972>*

## Modeling and Prediction

- A theoretical modeling study demonstrates how population-level heterogeneity in susceptibility to an infectious disease produces a phenomenon called “transient collective immunity”, which may lead to a temporary and misleading decrease in cases before reaching a wider and lasting herd immunity threshold. In the COVID-19 pandemic, persons highly susceptible to infection due to biological or social factors were infected early in the epidemic trajectory, removing these persons from the susceptible population, while the rest of the population were shielded from infection by stay-at-home orders. As behavioral patterns changed and previously low-risk persons became newly susceptible to higher risk of infection, subsequent waves of new diagnoses can occur.

*Tkachenko et al. (Apr 8, 2021). Time-Dependent Heterogeneity Leads to Transient Suppression of the COVID-19 Epidemic, Not Herd Immunity. Proceedings of the National Academy of Sciences. <https://doi.org/10.1073/pnas.2015972118>*

- A modeling study simulated the potential effects of a stricter, government-imposed lockdown policy in Sweden, a country that did not impose such a lockdown in early 2020. The authors compared COVID-related deaths, SARS-CoV-2 infections, and change in national GDP in Sweden from March 15-May 17, 2020 to a weighted average of similar neighboring countries that did impose lockdowns. The model estimated that if Sweden had imposed a 9-week lockdown in March 2020, infections would have been reduced by 75% and deaths would have been reduced by 38% with only moderate decreases in national GDP. Notably, the authors reported that although social mobility in Sweden decreased substantially in the absence of government-imposed lockdown, the decrease was less than what would have been expected to have occurred in a mandated lockdown.

*Born et al. (Apr 8, 2021). The Lockdown Effect: A Counterfactual for Sweden. PLOS ONE. <https://doi.org/10.1371/journal.pone.0249732>*

## Public Health Policy and Practice

- In September 2020, a CDC-assisted, tribally managed COVID-19 case investigation and contact tracing program for the Spirit Lake Tribe in North Dakota was implemented in response to increasing incidence of COVID-19. Between September 29 and November 20, 2020, 317 persons with confirmed COVID-19 and 667 close contacts were reported. 80% of patients with confirmed COVID-19 and 78% of 538 close contacts who did not receive a COVID-19 diagnosis were contacted by program staff within 24 hours of receipt of test results. During the assessment period, the incidence of COVID-19 in the Spirit Lake Tribe plateaued at 520 to 600 cases per 100,000 persons per week

while the incidence in North Dakota increased from 455 to 1,137 cases per 100,000/week. The authors note that using Spirit Lake community members as program staff was critical to program success due to their knowledge of alternate methods to reach patients or contacts, trust from the community, and the ability to provide culturally appropriate information about quarantine.

*Matthias et al. (Apr 9, 2021). Notes from the Field : COVID-19 Case Investigation and Contact Tracing Program — Spirit Lake Tribe, North Dakota, September–November 2020. MMWR.*

<https://doi.org/10.15585/mmwr.mm7014a4>

- A review of COVID-19 surveillance data from March–November 2020 in Montana revealed that COVID-19 incidence and mortality were higher among American Indian/Alaska Native (AI/AN) persons compared to white persons. The incidence of COVID-19 among AI/AN persons was 2.2-times higher than among White persons and COVID-19 mortality was 3.8-times higher. The case fatality rate was 1.7-times higher among AI/AN persons compared to White persons. The authors note that these data emphasize the importance of allocating vaccination resources and implementation of culturally appropriate public health measures to tribal communities.

*Williamson et al. (Apr 9, 2021). COVID-19 Incidence and Mortality Among American Indian/Alaska Native and White Persons — Montana, March 13–November 30, 2020. MMWR.*

<https://doi.org/10.15585/mmwr.mm7014a2>

- Trends over time and changes in the level of SARS-CoV-2 diagnostic testing and reporting practices can bias the estimates of the basic reproductive number ( $R_0$ ), an estimate of transmission. An increasing  $R_0$  could be overestimated if the proportion of cases captured increases over time, which can be affected by changes in testing eligibility and an increase in testing capacity, as occurred in the early months of the pandemic. The authors warn against using metrics such as  $R_0$  for guiding government-mandated restrictions without an understanding of how changes in testing practices may impact estimates of these metrics.

*Pitzer et al. (Apr 8, 2021). The Impact of Changes in Diagnostic Testing Practices on Estimates of COVID-19 Transmission in the United States. American Journal of Epidemiology.*

<https://doi.org/10.1093/aje/kwab089>

## Other Resources and Commentaries

- [SARS-CoV-2 Evolution in an Immunocompromised Host Reveals Shared Neutralization Escape Mechanisms](#) -- Cell (Mar 16)
- [SARS-CoV-2 Vaccine Development: Where Are We](#) -- European Review for Medical and Pharmacological Sciences (Mar)
- [Openness and COVID-19 Induced Xenophobia: The Roles of Trade and Migration in Sustainable Development](#) -- PLOS ONE (Apr 8)
- [From Vaccine Nationalism to Vaccine Equity — Finding a Path Forward](#) -- New England Journal of Medicine (Apr 8)
- [US-China Health Exchange and Collaboration Following COVID-19](#) -- The Lancet (Apr 9)
- [Why US Coronavirus Tracking Can't Keep up with Concerning Variants](#) -- Nature (Apr 9)
- [Data, Data All Around](#) -- The Lancet Digital Health (Apr 9)
- [Placing Sensors in Sewer Networks: A System to Pinpoint New Cases of Coronavirus](#) -- PLOS ONE (Apr 8)
- [Obtaining Prevalence Estimates of COVID-19: A Model to Inform Decision-Making](#) -- American Journal of Epidemiology (Apr 8)

- [People with Disability and the COVID-19 Pandemic: The Need for Empiric Research](#) -- Disability and Health Journal (Apr 5)
- [A Targeted E-Learning Approach for Keeping Universities Open during the COVID-19 Pandemic While Reducing Student Physical Interactions](#) -- PLOS ONE (Apr 8)

*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*