



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

February 17, 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 Minnesota Department of Health identified eight people who had been infected with the B.1.1.7 SARS-CoV-2 variant (first detected in the UK) from December 18, 2020–January 11, 2021. Three people had a history of international travel during the 14 days before illness onset, and three additional people had traveled domestically. [More](#)**
- **During April through July 2020, there was a 19% attack rate of COVID-19 among meat processing workers in Nebraska. Implementing universal masking and physical barrier interventions reduced COVID-19 incidence in less than 10 days in 8 of 13 facilities. [More](#)**
- **CD8+ T-cells from COVID-19 convalescent individuals can recognize epitopes derived from SARS-CoV-2 variants, suggesting that anti-SARS-CoV-2 CD8+ T-cell responses should recognize the newly described variants. [More](#)**

### Transmission

- There was a 19% COVID-19 attack rate (n=5,002 cases) among Nebraska meat processing workers during April 1–July 31, 2020. After implementing universal masking and physical barrier interventions, 8 of 13 facilities showed a statistically significant reduction in COVID-19 incidence in less than 10 days. While 67% of cases occurred among workers who identified as Hispanic or Latino ethnicity, they constituted 73% of hospitalizations, 78% of ICU admissions, and 86% of deaths. Male workers comprised 58% of confirmed case-patients, but represented 72% of hospitalizations, 78% of ICU admissions, and 81% of deaths.

*Herstein et al. (Feb 16, 2021). Characteristics of SARS-CoV-2 Transmission among Meat Processing Workers in Nebraska, USA, and Effectiveness of Risk Mitigation Measures. Emerging Infectious Diseases. [https://wwwnc.cdc.gov/eid/article/27/4/20-4800\\_article](https://wwwnc.cdc.gov/eid/article/27/4/20-4800_article)*

### Geographic Spread

- On January 9, 2021, the Minnesota Department of Health announced the identification of the B.1.1.7 SARS-CoV-2 variant (first described in the UK) in specimens from five people, and on January 25, this variant was found in samples from three additional people. The samples were collected between December 18, 2020 and January 11, 2021 from residents in five counties in the Minneapolis–St. Paul metropolitan area. Three people had a history of international travel during the 14 days before illness onset and three additional people had traveled to California. None had a history of travel to the United Kingdom.

*Firestone et al. (Feb 17, 2021). First Identified Cases of SARS-CoV-2 Variant B.1.1.7 in Minnesota – December 2020–January 2021. MMWR. <https://doi.org/10.15585/mmwr.mm7008e1>*

- The SARS-CoV-2 variant strain B.1.351 (first described in South Africa) was detected in Zambia in specimens collected from December 16–23, 2020. Among 23 specimens collected during this time, 22 (96%) were the B.1.351 variant, and among those 21 (95%) contained all nine B.1.351 lineage-defining mutations. Specimens with the B.1.351 variant were obtained from people across four provinces. Five (23%) specimens were obtained from people in two different clusters, with no known epidemiologic links among other cases. After detecting this variant, the average number of daily confirmed COVID-19 cases in Zambia increased 16-fold, from 44 cases during December 1–10 2020 increasing to 700 cases during January 1–10, 2021.  
*Mwenda et al. (Feb 17, 2021). Detection of B.1.351 SARS-CoV-2 Variant Strain — Zambia, December 2020. MMWR. <https://doi.org/10.15585/mmwr.mm7008e2>*
- *[Pre-print, not peer-reviewed]* Using combined data from UK air travel into US airports, SARS-CoV-2 genomic sequencing, and clinical diagnostics, a study found evidence for multiple independent introductions of the SARS-CoV-2 B.1.1.7 variant (first described in the UK) into the US, many of which have led to sustained community transmission. The authors conclude that the high number of B.1.1.7 sequences supports the prediction, based on incoming air passenger volumes from the UK, that New York, California, and Florida would be at highest risk for importation. Phylogenetic analyses suggested that New York acted as a hub for B.1.1.7 importation and spread to other states, and the study found evidence for community transmission of B.1.1.7 in New York, New Jersey, Connecticut, and Illinois during January, 2021.  
*Alpert et al. (Feb 2021). Early Introductions and Community Transmission of SARS-CoV-2 Variant B.1.1.7 in the United States. Pre-print downloaded Feb 17 from <https://doi.org/10.1101/2021.02.10.21251540>*

## Testing and Treatment

- A randomized clinical trial involving 240 patients hospitalized with moderate to severe COVID-19 found that compared with placebo, a single dose (200,000 IU) of vitamin D<sub>3</sub> did not significantly reduce length of hospital stay (HR = 1.07). The difference between the vitamin D<sub>3</sub> group and the placebo group was not significant for in-hospital mortality (8% vs 5%), admission to the intensive care unit (16% vs 21%), or need for mechanical ventilation (8% vs 14%). No adverse events were recorded, but an episode of vomiting was associated with the intervention.  
*Murai et al. (Feb 17, 2021). Effect of a Single High Dose of Vitamin D3 on Hospital Length of Stay in Patients With Moderate to Severe COVID-19: A Randomized Clinical Trial. JAMA. <https://jamanetwork.com/journals/jama/fullarticle/2776738>*
- Raw RT-PCR cycle threshold (Ct) values may lead to misinterpretation of the total viral burden, according to a study comparing tracheal aspirate (TA) with nasopharyngeal swab (NPS) samples in critically ill COVID-19 patients (n=138). The authors found that in general, TA samples had more total viral RNA than NPS samples, even though there was no difference in Ct value. Samples initially considered to have different viral loads by raw Ct comparison actually had the same viral load, which the authors argue highlights the importance of normalizing results using a reference gene approach in order to draw conclusions related to COVID-19 viral load. The authors also proposed a formula to corrected raw Ct values.  
*Miranda et al. (Feb 2021). Misinterpretation of Viral Load in COVID-19 Clinical Outcomes. Virus Research. <https://doi.org/10.1016/j.virusres.2021.198340>*

*[Pre-print, not peer-reviewed]* Three mutations found in the B.1.1.351 variant (first identified in South Africa) and the P1 variant (first identified in Brazil) completely abolished the interaction of monoclonal antibody treatment bamlanivimab with the receptor binding domain (RBD) of the virus. Additionally, the K417N, E484K, and N501Y mutations found in the variants had higher binding

affinity to the human ACE2 receptor compared to the wildtype RBD (about 2x higher) but less than the B.1.1.7 variant (~10 fold higher than wild-type). This suggests that variants containing these mutations may be more infectious than wild-type virus.

Liu et al. (Feb 16, 2021). 501Y.V2 and 501Y.V3 Variants of SARS-CoV-2 Lose Binding to Bamlanivimab in Vitro. *BioRxiv*. <https://doi.org/10.1101/2021.02.16.431305>

## Vaccines and Immunity

- [Pre-print, not peer-reviewed] Most convalescent sera from people who had recovered from COVID-19 and virtually all Pfizer-BioNTech mRNA vaccine-induced immune sera were shown to have diminished neutralizing activity against engineered SARS-CoV-2 strains including a chimeric strain combining a strain identified in Washington state with a B.1.351 spike gene (Wash SA-B.1.351 strain), or recombinant viruses containing mutations at position 484 and 501. Several highly neutralizing monoclonal antibodies (mAbs) lost inhibitory activity against Wash SA-B.1.351 or recombinant variants with an E484K spike mutation. The authors note that targeting of highly conserved regions, enhancement of mAb potency, or adjustments to the spike sequences of vaccines may be needed to prevent loss of protection *in vivo*.

Diamond et al. (Feb 2021). SARS-CoV-2 Variants Show Resistance to Neutralization by Many Monoclonal and Serum-Derived Polyclonal Antibodies. *Research Square*.

<https://doi.org/10.21203/rs.3.rs-228079/v1>

- [Pre-print, not peer-reviewed] A study assessing whether CD8+ T-cells from COVID-19 convalescent individuals (n=30) can recognize SARS-CoV-2 variant epitopes showed that only one of the three most prominent variants (the B.1.351 variant, first described in South Africa) had a mutation that overlapped with a low-prevalence CD8+ epitope. Out of 45 mutations assessed, this mutation was found on the third residue of the epitope. The authors argue that these findings suggest that virtually all anti-SARS-CoV-2 CD8+ T-cell responses should recognize these newly described variants.

Redd et al. (Feb 2021). CD8+ T Cell Responses in COVID-19 Convalescent Individuals Target Conserved Epitopes from Multiple Prominent SARS-CoV-2 Circulating Variants. Pre-print

downloaded Feb 17 from <https://doi.org/10.1101/2021.02.11.21251585>

## Clinical Characteristics and Health Care Setting

- Children with COVID-19 pneumonia were older (median age of 6.3 vs. 3.2 years) and had less severe disease than children with other causes of pneumonia, according to a retrospective multi-center cohort study. Children in the COVID-19 pneumonia cohort had a lower proportion of severe cases (1 of 40 vs. 38 of 284), and fewer cases with high fever (3 of 40 vs. 167 of 284), requiring intensive care (1 of 40 vs. 32 of 284), and with shorter symptomatic duration (median 5 vs. 8 days).

Ren et al. (Feb 2021). Comparison of Acute Pneumonia Caused by SARS-COV-2 and Other Respiratory Viruses in Children: A Retrospective Multi-Center Cohort Study during COVID-19

Outbreak. *Military Medical Research*. <https://pubmed.ncbi.nlm.nih.gov/33593415>

- [Pre-print, not peer-reviewed] A retrospective cohort study of 570,298 patients tested for SARS-CoV-2 with known race/ethnicity, found that people from racial/ethnic minority groups represented 50% of infections but only 18% of total tests. The data were drawn from a large health system spanning California, Oregon, and Washington between March 1 and December 31, 2020. People who identified as Hispanic represented 34% of total infections but only 13% of tests. 8,536 patients were hospitalized and 1,246 died, of whom 56% and 54% were non-white, respectively. Hispanic race/ethnicity was also associated with in-hospital mortality (OR=1.4).

Dai et al. (Feb 2021). Characteristics and Factors Associated with COVID-19 Infection, Hospitalization, and Mortality Across Race and Ethnicity. Pre-print downloaded Feb 17 from

<https://doi.org/10.1101/2020.10.14.20212803>

## Modeling and Prediction

- The COVID-19 early warning system (CovEWS), a risk assessment system tool for real-time forecasting of COVID-19 related mortality risk, was found to predict mortality up to 192 hours prior to mortality events in patients hospitalized with COVID-19. The model was constructed from a variety of clinical and biomarker inputs and at a sensitivity of greater than 95%, the specificity was 78.8% at 1 hour before a predicted mortality event and 69.4% at 192 hours before a predicted mortality event, comparing favorably to several other risk stratification tools. The system was developed using electronic health record data from a cohort of 66,430 patients seen at over 69 healthcare institutions.

*Schwab et al. (Feb 2021). Real-Time Prediction of COVID-19 Related Mortality Using Electronic Health Records. Nature Communications. <https://doi.org/10.1038/s41467-020-20816-7>*

- *[Pre-print, not peer-reviewed]* A data-driven model-inference approach to simulate the COVID-19 pandemic at the US county-scale determined that approximately one third of the US population had been infected during 2020. The model concluded that there was an overall ascertainment rate of 22%, and population susceptibility at year end was 69%. The percentage of people harboring a contagious infection rose above 0.8% before the end of the year and was as high as 2.4% in some major metropolitan areas. The infection fatality rate fell to 0.3% by the end of 2020.

*Pei et al. (Feb 17, 2021). Overall Burden and Characteristics of COVID-19 in the United States during 2020. Pre-print downloaded Feb 17 from <https://doi.org/10.1101/2021.02.15.21251777>*

## Other Resources and Commentaries

- [Vitamin D3 to Treat COVID-19: Different Disease, Same Answer](#) – JAMA (Feb 17)
- [Medicaid and COVID-19 Vaccination—Translating Equitable Allocation Into Equitable Administration](#) – JAMA Health Forum (Feb 17)
- [SARS-CoV-2 Variants of Concern in the United States – Challenges and Opportunities](#) – JAMA (Feb 17)
- [Modelling Safe Protocols for Reopening Schools during the COVID-19 Pandemic in France](#) – Nature Communications (Feb)
- [Using Health Insurance Network Provider Data and Public Data Sets to Identify SARS-CoV-2 Vaccinators in the USA](#) – Frontiers in Public Health
- [Protocol for Safe Affordable and Reproducible Isolation and Quantitation of SARS-CoV-2 RNA from Wastewater](#) – MedRxiv (Feb 17)
- [How Public Health Agencies Break through COVID-19 Conversations: A Strategic Network Approach to Public Engagement](#) – Health Communication (Feb)
- [Mask Usage, Social Distancing, Racial, and Gender Correlates of COVID-19 Vaccine Intentions among Adults in the US](#) – PLOS ONE (Feb 16)
- [How Can We Support COVID-19 Survivors? Five Lessons from Long-Term Cancer Survival](#) – Public Health (Jan)
- [Effects of COVID-19 on the Mental Health of Black and Brown Racialized Populations in the U.S.](#) – Archives of Psychiatric Nursing (Feb)
- [COVID-19 Pandemic Sheds Light on the Importance of Food Safety Practices: Risks, Global Recommendations, and Perspectives](#) – Critical Reviews in Food Science and Nutrition (Feb)
- [Epidemiological Surveillance of SARS-CoV-2 by Genome Quantification in Wastewater Applied to a City in the Northeast of France: Comparison of Ultrafiltration- and Protein Precipitation-Based Methods](#) – International Journal of Hygiene and Environmental Health (Jan)
- [Estimating Epidemiologic Dynamics from Cross-Sectional Viral Load Distributions](#) – MedRxiv : The Preprint Server for Health Sciences (Feb)

- [High Rates of COVID-19 Infection Among Indigenous Maya at a US Safety-Net Health System in California](#) – Public Health Reports (Washington, D.C. : 1974) (Feb)
- [Violence against Children during COVID-19: Assessing and Understanding Change in Use of Helplines](#) – Child Abuse & Neglect (Sept)
- [Discriminant Accuracy of the SOFA Score for Determining the Probable Mortality of Patients With COVID-19 Pneumonia Requiring Mechanical Ventilation](#) – JAMA (Feb 17)
- [High-Income Countries Have Secured the Bulk of COVID-19 Vaccines](#) – JAMA (Feb)

*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*