

2019-nCoV Literature Situation Report (Lit Rep)

July 21, 2020

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

- **A seroprevalence study in Blaine County, Idaho, a resort community with a high incidence of COVID-19 in March and April, found nearly a quarter of residents were positive for SARS-CoV-2 antibodies.** [More](#)
- **Mass testing in long term care facilities in San Francisco documented a large proportion of COVID-19 cases that were asymptomatic. Of the health care workers identified as the likely index case in each facility, 3 out of 4 reported working while symptomatic despite temperature and symptom surveillance before each shift.** [More](#)
- **In a cohort of 91 pregnant women with SARS-CoV-2 infection in Spain, the rate of hospitalization and ICU admission were double the corresponding rates for non-pregnant women of the same age. Cesarean section rates were more than three times higher among women hospitalized due to COVID-19 compared to pregnant women hospitalized for other reasons.** [More](#)
- **A modeling study found that, while the use of face masks could contribute to the control of the spread of SARS-CoV-2, scenarios in which mask wearers are more likely to mix with other mask wearers than with non-mask wearers will reduce the effect of face masks on population-level transmission.** [More](#)

Non-Pharmaceutical Interventions

- A systematic review (n=13 studies) found that filtering facepiece respirators maintained certification standards following ultraviolet germicidal irradiation (UVGI), and that UVGI did not compromise fit. UVGI protocols using a cumulative dose of >40,000 J/m² resulted in a 3-log reduction in viral load, versus 2-log reduction in viral load for with a cumulative dose >20,000 J/m².
Katie et al. (July 13, 2020). Decontaminating N95 and SN95 Masks with Ultraviolet Germicidal Irradiation (UVGI) Does Not Impair Mask Efficacy and Safety: A Systematic Review. Journal of Hospital Infection. <https://doi.org/10.1016/j.jhin.2020.07.014>

Transmission

- A systematic literature review of COVID-19 in pregnant women and neonates (n=21 studies corresponding to 90 pregnancies and 92 neonates) found that the most common symptoms among pregnant women were fever, cough, and difficulty breathing. Three women were admitted to the ICU and required mechanical ventilation, including one woman who died and another who was still receiving intensive care at the time of publication. The most commonly-reported complications

were preterm labor (n=29), fetal distress (n=15), premature rupture of membranes (n=6), chorioamnionitis (n=1) and stillbirth (n=1).

- Four out of 86 (5%) neonates tested for SARS-CoV-2 were positive. One neonate was negative at birth and positive 24 hours later; a corresponding amniotic fluid sample was positive, but cord blood was negative.

Ashraf et al. (2020). Coronavirus Disease 2019 (COVID-19): A Systematic Review of Pregnancy and the Possibility of Vertical Transmission. Journal of Reproduction & Infertility.

<http://www.ncbi.nlm.nih.gov/pubmed/32685412>

- *[pre-print, not peer-reviewed]* A representative seroprevalence survey of residents of Blaine County, Idaho, a resort community with a high incidence of COVID-19 in March and April, found that 23% of residents had antibodies against SARS-CoV-2. Based on the number of reported cases, this suggests that more than 80% of SARS-CoV-2 infections were not reported.

McLaughlin et al. (July 21, 2020). High Community SARS-CoV-2 Antibody Seroprevalence in a Ski Resort Community Blaine County Idaho US. Preliminary Results. Pre-print downloaded July 21 from <https://doi.org/10.1101/2020.07.19.20157198>

- A seroprevalence study conducted April 28-May 3 in two high-incidence counties in metropolitan Atlanta (n=394 households and 696 people) found an estimated seroprevalence of 3% overall, and 5% among non-Hispanic Black participants. Of those seropositive, 50% reported illness or symptoms consistent with COVID-19, of whom 28% sought care and 16% were tested, demonstrating that many infections would not have been identified through case-based or syndromic surveillance.

Biggs et al. (July 21, 2020). Estimated Community Seroprevalence of SARS-CoV-2 Antibodies — Two Georgia Counties, April 28–May 3, 2020. MMWR.

<https://doi.org/10.15585/mmwr.mm6929e2>

- A state-wide study from Indiana conducted on a random statewide sample of non-institutionalized residents (12 years or older) from April 25-29 (n=3,658, representing a 24% response rate) estimated the prevalence of active infection, based on RT-PCR testing, was 1.7%, with 44% reporting no positive symptoms in the preceding two weeks. Estimated seropositivity was 1.1%, bringing overall prevalence of current and previous infections to 2.8%. Overall prevalence was significantly higher among Hispanic respondents (8.3%), and among individuals reporting a household member who had previously been told they had COVID-19 (33.6%). Among a non-random sample recruited from a more racially and ethnically diverse group, 22.8% were positive by RT-PCR (20% asymptomatic) and 5.8% were seropositive.

Menachemi et al. (July 21, 2020). Population Point Prevalence of SARS-CoV-2 Infection Based on a Statewide Random Sample — Indiana, April 25–29, 2020. MMWR.

<https://doi.org/10.15585/mmwr.mm6929e1>

- Havers et al. report a cross-sectional seroprevalence survey conducted on a convenience sample of residual sera collected from March 23 through May 12 for routine clinical testing in San Francisco (SF), Connecticut (CT), south Florida (SF), Louisiana (LA), Minneapolis-St Paul-St Cloud metro area (MN), Missouri (MS), New York City Metro Area (NYC), Philadelphia metro area (PA), Utah (UT), and western Washington state (WA) (n=16,025 individuals). Seropositivity ranged from 1% in SF (late April) to 7% in NYC (late March/early April).

- The estimated number of infections ranged from 6- to 24-times the number of reported cases.
[EDITORIAL NOTE: Seropositivity in individuals undergoing routine clinical testing may not reflect

seropositivity in the general population. A version of these findings was published as a pre-print article that was included in this Literature Report on June 29, 2020]

Havers et al. (July 21, 2020). Seroprevalence of Antibodies to SARS-CoV-2 in 10 Sites in the United States, March 23-May 12, 2020. *JAMA Internal Medicine*.

<https://doi.org/10.1001/jamainternmed.2020.4130>

Geographic Spread

- An ecological study of COVID-19 hotspots in New York City and Chicago found that hot spots included ZIP codes with lower rates of college graduates and higher proportions of people of color; however, household size had a stronger effect than population density. New York City hotspots tended to be among more working-class and middle-income neighborhoods, while Chicago's hot spots occurred more commonly among the neighborhoods with high rates of poverty and unemployment.

Maroko et al. (July 20, 2020). *COVID-19 and Inequity: A Comparative Spatial Analysis of New York City and Chicago Hot Spots*. *Journal of Urban Health*.

<https://doi.org/10.1007/s11524-020-00468-0>

Testing and Treatment

- Among 236 patients with severe COVID-19 pneumonia treated with tocilizumab over a median follow-up of 83 days, 55% required ICU admission, 49% required invasive mechanical ventilation, and 13% died. The investigators evaluated response to tocilizumab using multiple methods and found that the response defined by stable or decreasing scores on the Lower Brescia COVID Respiratory Severity Scale was associated with lower odds of mortality (OR=0.14, 95% CI 0.03 – 0.74), while response defined by other methods was not associated with mortality.

Moreno-Pérez et al. (July 16, 2020). *Experience with Tocilizumab in Severe COVID-19 Pneumonia after 80 Days of Follow-up: A Retrospective Cohort Study*. *Journal of Autoimmunity*.

<https://doi.org/10.1016/j.jaut.2020.102523>

Clinical Characteristics and Health Care Setting

- [pre-print, not peer-reviewed] Yao et al. analyzed antibody kinetics using 244 serial blood samples from 34 people with COVID-19. All types of antibodies measured were detected approximately two weeks after illness onset. Based on estimated half-life, the authors estimated median times to seronegativity following disease onset to be 4.6 months for IgM (IQR 4.1-5.0), 7.8 months for IgA (IQR 6.7-9.2), and 43 months (IQR 34-48) for IgG. Neutralizing antibodies (Nab) declined faster than IgG but slower than IgM. The relative contribution of IgM to Nab was higher than that of IgG.

Yao et al. (July 21, 2020). *Neutralizing and Binding Antibody Kinetics of COVID-19 Patients during Hospital and Convalescent Phases*. Pre-print downloaded July 21 from

<https://doi.org/10.1101/2020.07.18.20156810>

- [pre-print, not peer-reviewed] Sudre et al. present data from 1,653 individuals who had confirmed COVID-19 and regularly logged their symptoms using the COVID Symptom Study app, which was developed by the King's College London and ZOE. Their analysis classified six distinct types of COVID-19 distinguished by clusters of symptoms and used type to predict the need for respiratory support.

- Wise published a summary and interpretation of this study. <https://doi.org/10.1136/bmj.m2911>

Sudre et al. (June 16, 2020). *Symptom Clusters in Covid19 A Potential Clinical Prediction Tool from the COVID Symptom Study App*. Pre-print downloaded July 21 from

<https://doi.org/10.1101/2020.06.12.20129056>

- Barbero et al. report findings from a retrospective cohort study of all women diagnosed with SARS-CoV-2 infection during pregnancy or the postpartum period (n=91) in a tertiary care center in Spain. COVID-19 symptoms were the presenting complaint in 62% of patients. Forty patients (44%) developed pneumonia, 46% were hospitalized, and 4 required ICU admission, which was double the hospitalization (15.8-21.9%) and ICU admission (1.3-2.2%) rate for non-pregnant female patients of the same age in Spain. The rate of cesarean section was more than three times higher among women hospitalized due to COVID-19 (82%) than women who were hospitalized for other reasons (25%).

Barbero et al. (July 20, 2020). SARS-CoV-2 in Pregnancy: Characteristics and Outcomes of Hospitalized and Non-Hospitalized Women Due to COVID-19. The Journal of Maternal-Fetal & Neonatal Medicine. <https://doi.org/10.1080/14767058.2020.1793320>

Modeling and Prediction

- Using a next generation matrix approach, Fisman et al. found that even modest use of imperfect masks reduce COVID-19 transmission, and widespread use may be able to bring $R_0 < 1$ if it has already been brought close to 1 by other interventions. However, the effect of mask wearing on transmission at a population level is reduced in scenarios in which mask wearers are more likely to mix with other mask wearers than with non-wearers (assortative mixing).

Fisman et al. (2020). Bidirectional Impact of Imperfect Mask Use on Reproduction Number of COVID-19: A next Generation Matrix Approach. Infectious Disease Modelling. <https://doi.org/10.1016/j.idm.2020.06.004>

Public Health Policy and Practice

- Louie et al. describe the results of surveillance, outbreak response, and control measures to prevent COVID-19 in 4 long term care facilities (LCTF) in San Francisco early in the pandemic. Facility-wide testing of asymptomatic health care workers (HCWs) and residents in these 4 facilities (n=303) found 16% of HCWs and 40% of residents were positive. Across facilities, the proportion of COVID-19 cases who were asymptomatic ranged from 4% to 41% among HCWs and 20% to 75% among residents. Despite temperature and symptom surveillance before each shift, out of the 4 HCWs identified as the index case for outbreaks, 3 reported working while symptomatic, all of whom wore masks but not necessarily eye protection, gloves, or gowns.

Louie et al. (July 20, 2020). Lessons from Mass-Testing for COVID-19 in Long Term Care Facilities for the Elderly in San Francisco. Clinical Infectious Diseases. <https://doi.org/10.1093/cid/ciaa1020>

- Escobar et al. report on an outbreak in a Pennsylvania nursing home with 84 residents (83 male, mean age 74). The index resident tested positive after exposure to a positive employee who had not yet developed symptoms. Interventions implemented included a dedicated isolation unit, restrictions on resident travel, universal masking of residents, addition of eye shields to PPE mandated for staff, and serial testing of residents every 3-5 days. Twenty-seven residents tested positive (26 from the index resident's floor), representing an attack rate of 37%, and 13 residents developed symptoms.

Escobar et al. (July 20, 2020). Mitigation of a COVID-19 Outbreak in a Nursing Home Through Serial Testing of Residents and Staff. Clinical Infectious Diseases. <https://doi.org/10.1093/cid/ciaa1021>

Other Resources and Commentaries

- [Detecting Emerging COVID-19 Community Outbreaks at High Spatiotemporal Resolution - New York City June 2020](#) – medRxiv (July 21)
- [Child Care in the Time of COVID-19: A Period of Challenge and Opportunity](#) – The Journal of Pediatrics (July 17)
- [Tocilizumab Improves Survival in Patients with Persistent Hypoxia in Severe COVID-19 Pneumonia](#) – EClinicalMedicine (July 7)
- [Falling Stroke Rates during COVID-19 Pandemic at a Comprehensive Stroke Center](#) – Journal of Stroke and Cerebrovascular Diseases : The Official Journal of National Stroke Association (Aug)
- [Should Coronavirus Disease 2019–Associated Inflammatory Syndromes in Children Affect Social Reintegration?](#) – JAMA Pediatrics (July 20)
- [SARS-CoV-2 in the Environment: Modes of Transmission, Early Detection and Potential Role of Pollutions](#) – Science of The Total Environment (July 15)
- [Encouraging Results from Phase 1/2 COVID-19 Vaccine Trials](#) – The Lancet (July 20)
- [Inclusion of Children and Pregnant Women in COVID-19 Intervention Trials](#) – Pediatric Research (July 20)
- [Rigorous Hand Hygiene Practices Among Health Care Workers Reduce Hospital-Associated Infections During the COVID-19 Pandemic](#) – Journal of Primary Care & Community Health (July 19)

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