



2019-nCoV Literature

Situation Report (Lit

Rep)

November 30, 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 model estimating the societal and healthcare burdens of SARS-CoV-2 infections indicated that there were 2.4 million hospitalizations and 44.8 million symptomatic illnesses in the U.S. from February 27–September 30, 2020, yet only 1 of every 2.5 hospitalized infections and 1 of every 7.1 non-hospitalized illnesses may have been reported** [More](#)
- **A simulation-based evaluation of policies to reduce in-school SARS-CoV-2 transmission in New York City public schools found that the most effective solutions were infection control measures such as mask wearing, physical distancing, good indoor ventilation, and hand washing.** [More](#)
- **Fewer than half of children who tested positive for SARS-CoV-2 had a household sick contact (HHSC) in a retrospective study. Among cases with a HHSC, there was no evidence of child-to-adult transmission.** [More](#)
- **Generation of S-, RBD-, and N-specific IgG SARS-CoV-2 antibodies, which were found to be important in viral clearance and recovery, occurred one week later in patients with severe COVID-19 compared to patients with mild/moderate disease.** [More](#)

Non-Pharmaceutical Interventions

- A study assessing human mobility changes in the US from February to May indicated that government orders and the severity of local SARS-CoV-2 outbreaks significantly contributed to the strength of social distancing in the United States. The study used an integrated dataset of mobile device location data and constructed a Social Distancing Index to evaluate changes in people's movement patterns along with the spread of SARS-CoV-2 at different geographic levels.

Pan et al. (Nov 26, 2020). Quantifying Human Mobility Behaviour Changes during the COVID-19 Outbreak in the United States. Scientific Reports. <https://doi.org/10.1038/s41598-020-77751-2>

Transmission

- A retrospective study of infection patterns among contacts of 71 children with confirmed SARS-CoV-2 infection in an urban setting found that fewer than half of children who tested positive had a household sick contact (HHSC). HHSCs were defined as someone who either tested positive for SARS-CoV-2 or who had symptoms consistent with COVID-19. In all cases where a HHSC was identified,



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there was no evidence of child-to-adult transmission, and only one case of child-to-child transmission among siblings.

Pitman-Hunt et al. (Nov 27, 2020). SARS-CoV-2 Transmission in an Urban Community: The Role of Children and Household Contacts. Journal of the Pediatric Infectious Diseases Society. <https://doi.org/10.1093/jpids/piaa158>

- A study of patients with persistent positive RT-PCR results for SARS-CoV-2 concluded that the presence of subgenomic (SG) viral RNA, which is only found in replicating viruses, might indicate that some patients had actively replicating virus. Samples from 60 individuals who had prolonged viral shedding (24-101 days) since their first RT-PCR test were evaluated. SG RNA was found in 60% of samples 28-79 days after symptom onset. The age of patients from whom the samples were taken varied from 40 to 100 years, as did the severity of illness (40% mild, 20% intermediate, and 40% severe).

Rodríguez-Grande et al. (Nov 25, 2020). Inference of Active Viral Replication in Cases with Sustained Positive RT-PCRs for SARS-CoV-2. Journal of Clinical Microbiology. <https://doi.org/10.1128/JCM.02277-20>

- A systematic review assessing the risk of transmission of respiratory viruses in outdoor versus indoor settings found that overall risk is lower outdoors, but there are gaps in the evidence. Five studies showed that few reported global SARS-CoV-2 infections have occurred outdoors (<10%) and the odds of indoor transmission was much higher (18.7 times, 95% CI 6.0-57.9). Seven other studies evaluated outdoor transmission of influenza (n=5) or adenoviruses (n=2) and found heterogeneity in study quality and definitions of outdoor settings. Factors generally associated with infection outdoors included duration and frequency of personal contact, lack of PPE, and occasional indoor gathering during an outdoor event.

Bulfone et al. (Nov 29, 2020). Outdoor Transmission of SARS-CoV-2 and Other Respiratory Viruses, a Systematic Review. The Journal of Infectious Diseases. <https://doi.org/10.1093/infdis/jiaa742>

- Phylogenetic analysis of recurrent mutations identified in a dataset of 46,723 SARS-CoV-2 viral genomes isolated from patients across the world did not detect any single mutation that was associated with significantly increased transmission ability; overall SARS-CoV-2 genomic diversity was limited. The study focused on identifying homoplasies, traits or sites that independently emerged over time. The authors suggest that recurrent mutations in circulation appeared to result from RNA editing via the human immune system rather than an adaptive process.

van Dorp et al. (Dec 25, 2020). No Evidence for Increased Transmissibility from Recurrent Mutations in SARS-CoV-2. Nature Communications. <https://doi.org/10.1038/s41467-020-19818-2>

Geographic Spread

- *[Pre-print, not peer-reviewed]* An assessment of COVID-19 growth in counties with universities showed that small metro and non-metro counties had a dramatic infection spike near the beginning of the semester (weeks 2-6) and infection growth remained significantly higher than their large and medium metro counterparts for the study duration (through September 27, 2020). The authors suggest that students moving back into university communities likely contributed to the spread of COVID-19 throughout the larger community.

Penuliar et al. (Nov 29, 2020). COVID-19 Growth in Rural versus Urban Counties with Major Universities at the Start of the 2020 Academic Year. Pre-print downloaded Nov. 30 from <https://doi.org/10.1101/2020.11.25.20238642>

Testing and Treatment

- A multi-site US study comparing the clinical performance of two cobas® RT-PCR tests, the Liat point of care test versus the most widely used test, the 68/8800 test, found that tests showed similar performance characteristics. The Liat test provides results in approximately 20 minutes. Overall agreement between the Liat and 68/8800 systems for SARS-CoV-2 diagnostics was 98.6% (352/357). Using Liat, positive percent agreement for SARS-CoV-2 was 100% (162/162) and the negative percent agreement was 97.4% (190/195).

Hansen et al. (Nov 25, 2020). Clinical Performance of the Point-of-Care Cobas Liat for Detection of SARS-CoV-2 in 20 Minutes: A Multicenter Study. *Journal of Clinical Microbiology*. <https://doi.org/10.1128/JCM.02811-20>

Vaccines and Immunity

- An analysis of laboratory tests from 1850 patients hospitalized with COVID-19 showed changes in SARS-CoV-2 antibody levels over time, and that levels of spike protein (S)- or receptor-binding domain (RBD)-specific IgG were important in viral clearance and recovery. Generation of S-, RBD-, and nucleoprotein (N)-specific IgG occurred one week later in patients with severe COVID-19 compared to patients with mild/moderate disease, while S- and RBD-specific IgG levels were 1.5-fold higher in patients with severe disease during hospitalization. During hospitalization, RBD-specific IgG levels were 4 times higher in older patients than in younger patients. Lower S-, RBD-, and N-specific IgG levels were associated with a lower lymphocyte percentage and longer viral shedding.

Li et al. (Dec 27, 2020). Dynamic Changes in Anti-SARS-CoV-2 Antibodies during SARS-CoV-2 Infection and Recovery from COVID-19. *Nature Communications*. <https://doi.org/10.1038/s41467-020-19943-y>

Clinical Characteristics and Health Care Setting

- A cross-sectional study at a London hospital found that some healthcare workers with severe symptoms of COVID-19 delayed seeking medical attention. Of 236 healthcare workers who reported symptoms consistent with COVID-19, the most common symptoms were cough (76%), fever (59%), breathlessness (36%), and loss of smell (42%). Five of nine respondents experiencing severe breathlessness and hypoxia did not seek formal medical treatment. Two respondents required hospitalization and recovered after oxygen therapy. 84 respondents (41%) required greater than the obligated 7 days off work, and 9 required greater than 3 weeks off.

de Wilton et al. (Nov 26, 2020). Delayed Healthcare Seeking and Prolonged Illness in Healthcare Workers during the COVID-19 Pandemic: A Single-Centre Observational Study. *BMJ Open*. <https://doi.org/10.1136/bmjopen-2020-040216>

- A study assessing the potential utility of COVID-19 community SARS-CoV-2 test positivity levels or incidence to inform testing strategies of nursing home staff in Indiana did not find a meaningful threshold to predict homes with SARS-CoV-2-positive staff. Using county-level metrics of cases per 10,000 population or positivity rates to predict detection of any infected staff within a facility resulted in areas under the curve of 0.648 and 0.649, respectively. 28% of staff members tested were certified nursing assistants, who accounted for 36.9% of all positive tests among staff. Licensed practical nurses represented 1.4% of staff and 4.7% of positive cases.

Blackburn et al. (Oct 2020). Community Coronavirus Disease 2019 Activity Level and Nursing Home Staff Testing for Active Severe Acute Respiratory Syndrome Coronavirus 2 Infection in Indiana. *Journal of the American Medical Directors Association*. <https://doi.org/10.1016/j.jamda.2020.10.038>

- [Pre-print, not peer-reviewed] An analysis of potential bidirectional relationships between neuropsychiatric disorders and COVID-19 showed that genetic liability to bipolar disorder slightly increased COVID-19 susceptibility and severity, and there was no consistent evidence of COVID-19 influencing risk of developing psychiatric disorders. A combination of bipolar disorder and schizophrenia was associated with greater risk of contracting SARS-CoV-2 in a univariable Mendelian randomization analysis.

Luykx et al. (Nov 30, 2020). Are Psychiatric Disorders Risk Factors for COVID-19 Susceptibility and Severity: A Two-Sample Bidirectional Univariable and Multivariable Mendelian Randomization Study. Pre-print downloaded Nov. 30 from <https://doi.org/10.1101/2020.11.29.20240481>

Modeling and Prediction

- A modeling study of social distancing mandates on SARS-CoV-2 population dynamics indicated that slight delays in implementing social distance protocols did not have a strong effect on the epidemic curve, but did identify a critical window of approximately two weeks in which to implement a mandate to avoid a substantially larger increase in incidence. The model used separate compartments for susceptible and asymptomatic infectious individuals with different social distancing practices. In scenarios testing strategies to relax social distancing mandates, sudden reopening potentially negated initial gains made to prevent infections under distancing requirements.

Gevertz et al. (Nov 2020). A Novel COVID-19 Epidemiological Model with Explicit Susceptible and Asymptomatic Isolation Compartments Reveals Unexpected Consequences of Timing Social Distancing. *Journal of Theoretical Biology*. <https://doi.org/10.1016/j.jtbi.2020.110539>

- [Pre-print, not peer-reviewed] An evaluation of policies to reduce in-school SARS-CoV-2 transmission in New York City public schools simulated that the greatest reductions in transmission could be achieved through infection control measures (mask wearing, physical distancing, good indoor ventilation, hand washing); further reductions could be achieved through small rotating class cohorts, widespread testing at the start of the week, and daily symptom screening, and self-isolation. Randomly testing 10-20% of school attendees did not have a strong effect on reducing transmission.

Bershteyn et al. (Nov 27, 2020). Which Policies Most Effectively Reduce SARS-CoV-2 Transmission in Schools. Pre-print downloaded Nov. 30 from <https://doi.org/10.1101/2020.11.24.20237305>

- A simple probabilistic multiplier model estimating the societal and healthcare burdens of SARS-CoV-2 infections indicated that 2.4 million hospitalizations, 44.8 million symptomatic illnesses, and 52.9 million total infections may have occurred in the U.S. during February 27–September 30, 2020. Laboratory-confirmed infections that were reported were adjusted for potential under-detection based on testing practices and assay sensitivity. The authors estimated that through the end of September, only 1 of every 2.5 hospitalized infections and 1 of every 7.1 non-hospitalized illnesses

may have been reported. They adjusted for potential under-detection by applying testing practices and assay sensitivity multipliers to the number of laboratory-confirmed reported infections.

Reese et al. (Nov 25, 2020). Estimated Incidence of COVID-19 Illness and Hospitalization — United States, February–September, 2020. Clinical Infectious Diseases. <https://doi.org/10.1093/cid/ciaa1780>

Other Resources and Commentaries

- [COVID-19 Case Investigation and Contact Tracing: Early Lessons Learned and Future Opportunities](#) – Journal of Public Health Management and Practice (Jan/Feb 2021)
- [Public Health Officials and COVID-19: Leadership, Politics, and the Pandemic](#) – Journal of Public Health Management and Practice (Jan/Feb 2021)
- [Implications of the COVID-19 Pandemic on LGBTQ Communities](#) – Journal of Public Health Management and Practice (Jan/Feb 2021)
- [N95 Respirator Reuse During the COVID-19 Pandemic: Healthcare Workers Perceptions and Attitudes](#) – Infection Control & Hospital Epidemiology (Nov 26 2020)
- [Communicating Effectively About Emergency Use Authorization and Vaccines in the COVID-19 Pandemic](#) – American Journal of Public Health (Nov 25 2020)
- [The Legal Response to COVID-19: Legal Pathways to a More Effective and Equitable Response](#) – Journal of Public Health Management and Practice (Jan/Feb 2021)
- [COVID-19 Vaccines Poised for Launch, but Impact on Pandemic Unclear](#) – Nature Biotechnology (Nov 25 2020)
- [Will Covid-19 Vaccines Be Cost Effective—and Does It Matter?](#) – BMJ (Nov 26 2020)
- [SARS-CoV-2 \(COVID-19\) Superspreader Events](#) – Journal of Infection (Nov 24 2020)
- [Supporting and Protecting Residents Experiencing Homelessness in the Nation’s Largest Cities During COVID-19](#) – Journal of Public Health Management and Practice (Jan/Feb 2021)
- [Variation Among Public Health Interventions in Initial Efforts to Prevent and Control the Spread of COVID-19 in the 50 States, 29 Big Cities, and the District of Columbia](#) – Journal of Public Health Management and Practice (Jan/Feb 2021)
- [Lessons Relearned? H1N1, COVID-19, and Vaccination Planning](#) – Journal of Public Health Management and Practice (Jan/Feb 2021)
- [State of the Public Health Workforce: Trends and Challenges Leading Up to the COVID-19 Pandemic](#) – Journal of Public Health Management and Practice (Jan/Feb 2021)
- [The COVID-19 Pan-Syndemic – Will We Ever Learn?](#) – Clinical Infectious Diseases (Nov 29 2020)
- [Trustworthiness before Trust — Covid-19 Vaccine Trials and the Black Community](#) – New England Journal of Medicine (Nov 26 2020)
- [Negative Conversion Rate of SARS-CoV-2 Infection](#) – JAMA Internal Medicine (Nov 30 2020)
- [Negative Conversion Rate of SARS-CoV-2 Infection - Reply](#) – JAMA Internal Medicine (Nov 30 2020)
- [Correction to: The Use of Intravenous Immunoglobulin Gamma for the Treatment of Severe Coronavirus Disease 2019: A Randomized Placebo-Controlled Double-Blind Clinical Trial](#) - BMC Infectious Diseases (Nov 26 2020)

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Management Team*

