



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

April 6, 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

- ▣ **Genetic sequencing of SARS-CoV-2 samples suggests that the virus was circulating in Washington State 4-6 weeks before the first community-acquired case was detected on February 28.**
- ▣ **A study found an association between temperature and COVID-19 incidence, with a significant reduction of case rates with mean maximum temperatures above 72.5°F**
- ▣ **Patient-collected tongue, nasal, and mid-turbinate samples had similar sensitivity in detecting SARS-CoV-2 to nasopharyngeal samples, and could be a safer and more efficient method to collect samples.**
- ▣ **A study lists a two-step disinfection process to disinfect PPE while another study suggests that medical masks and N95 respirators offer similar protection against viral respiratory infection during non-aerosol generating procedures.**

### Non-Pharmaceutical Interventions

- In this ecological study, the authors found that countries that promoted widespread face mask usage had lower cumulative numbers of COVID-19 diagnosis after controlling for testing intensity and age of the epidemic. While cautioning about the ecological fallacies, the study supports widespread usage of face masks in public in addition to the full package of interventions that have proven to work in Asian countries (rapid response, extensive testing, and contact isolation).  
*Kenyon (Apr 2, 2020). Widespread use of face masks in public may slow the spread of SARS CoV-2: an ecological study. Pre-print downloaded Apr 6 from <https://doi.org/10.1101/2020.04.02.20051417>*

### Transmission

- Bedford et al sequenced 346 SARS-CoV-2 genome from samples collected between February 20 and March 15 in Washington State. The majority of infections appeared to have derived from a single introduction event in late January or early February, suggesting cryptic spread of COVID-19 during the months of January and February.
- These findings highlight the critical need for widespread surveillance of SARS-CoV-2 community transmission throughout the U.S. and world, even after the current pandemic is brought under control.

*Bedford et al. (Apr 6, 2020). Cryptic transmission of SARS-CoV-2 in Washington State. Pre-print downloaded Apr 6 from <https://doi.org/10.1101/2020.04.02.20051417>*

- Anfinrud et al describe their use of laser light-scattering to detect SARS-CoV-2 droplet emission while speaking and suggest that it could be a major mode of transmission. While droplets emitted from speaking are smaller than those emitted when coughing or sneezing, they are sufficiently large to carry other respiratory pathogens, such as the measles virus and influenza virus, and are more numerous than droplets from coughing.
- The authors suggest that, if speaking proves to be a major mechanism of SARS-CoV-2 transmission, wearing cloth face masks in addition to strict social distancing and hand washing could significantly decrease transmission until a vaccine becomes available.

*Anfinrud et al. (Apr 6, 2020). Could SARS-CoV-2 be transmitted via speech droplets? Pre-print downloaded Apr 6 from <https://doi.org/10.1101/2020.04.02.20051417>*

- Song et al conducted RT-PCR testing in semen samples from 12 patients who were in the recovery stage of COVID-19, and from a testicular tissue sample from 1 deceased patient. They found no evidence that SARS-CoV-2 can infect the male genital tract or testes, indicating that the virus cannot be sexually transmitted from males.

*Song et al. (Apr 4, 2020). Detection of 2019 novel coronavirus in semen and testicular biopsy specimen of COVID-19 patients. Pre-print downloaded Apr 6 from <https://doi.org/10.1101/2020.03.31.20042333>.*

## Geographic Spread

- Results from this study suggest there is some association between COVID-19 incidence and regions at or above 30° latitude N (i.e. China- 31°; Italy- 41°) and a breakpoint at 72.5°F at which a significant reduction of case rates was observed.
- While the study does not confirm the COVID-19 cannot survive or transmit in warm and humid temperatures nor establish a causal connection between temperature and transmission, the southern hemisphere should expect increased case rates as the region moves from summer into fall and winter.

*Triplett (Apr 6, 2020). Evidence that higher temperatures are associated with lower incidence of COVID-19 in pandemic state, cumulative cases reported up to March 27, 2020. Pre-print downloaded Apr 6 from <https://doi.org/10.1101/2020.03.31.20048652>*

## Testing and Treatment

- The author used modeling to simulate the effects of increasing true positive rates of testing and the number of tests per day on slowing spread of COVID-19, and reports that the true positive rate can increase with large increases in testing or by improving the prediction on whom to test.
- To better allocate tests, a scoring system could be used based on contacts and locations, demographics, weather, type of places visited and time of day to build a robust model. This model could be used on top of virus spread models and tracking contacts. The article suggests that increasing the true positive by one or two percentage points could have the same impact as increasing the number of tests by tens of thousands.

*Rodriguez (Apr 6, 2020). Predicting Whom to Test is More Important Than More Tests – Modeling the Impact of Testing on the Spread of COVID-19 Virus By True Positive Rate Estimation. Pre-print downloaded Apr 6 from <https://doi.org/10.1101/2020.04.01.20050393>*

- This study explored the equivalency of patient-collected tongue, nasal and mid-turbinate samples to healthcare collected nasopharyngeal samples for detecting SARS-CoV-2. The sensitivity of patient collected samples was calculated to be above 90% and the sampling was feasible in ambulatory practice, even in cohorts of nearly 500 patients.
- Patient-collected sampling has several advantages over nasopharyngeal sampling: it reduces PPE use, is more comfortable to the patient, reduces the risk of exposure of the health workforce, and can improve clinical efficiency.

*Tu et al. (Apr 6, 2020). Patient-collected tongue, nasal, and mid-turbinate swabs for SARS-CoV-2 yield equivalent sensitivity to health care worker collected nasopharyngeal swabs. Pre-print downloaded Apr 6 from <https://doi.org/10.1101/2020.04.01.20050005>*

- Wuhan Blood Center screened donations for SARS-CoV-2 RNA in real-time and retrospectively and found plasma samples positive for viral RNA from 4 asymptomatic donors.
- The study suggest that donors should call the blood donation center if they have any COVID-19 symptoms after donating, in case the donation occurred during the COVID-19 incubation period, and donations should be screened for viral RNA with high-sensitivity assays to ensure blood safety.

*Chang et al. (Apr 3, 2020). Severe Acute Respiratory Syndrome Coronavirus 2 RNA Detected in Blood Donations. CDC Emerg Infect Dis [https://wwwnc.cdc.gov/eid/article/26/7/20-0839\\_article](https://wwwnc.cdc.gov/eid/article/26/7/20-0839_article)*

### Clinical Characteristics and Health Care Setting

- The CDC COVID-19 Response Team reviewed lab confirmed pediatric cases of COVID-19 in the U.S. during February 12-April 2 and compared it to data on adults aged 18-64 years. Of the 149,082 (99.6%) cases for which age was known, 1.7% were among children under 18 years old and the median age was 11 years. Among the small proportion of patients with data available, 73% had symptoms of fever, cough or shortness of breath compared with 93% of adults, and 5.7% were hospitalized compared to 10% of adults.
- These preliminary findings further add to current knowledge that children do not always have fever or cough, and can play a role in spread of COVID-19, underscoring the importance of following CDC guidance of staying at home, good respiratory hygiene and wearing cloth face coverings when around others.
- Additionally, clinicians should maintain a high index of suspicion for COVID-19 in children and monitor for progression of illness, particularly among infants and children with underlying conditions.

*CDC COVID-19 Response Team (Apr 6, 2020). Coronavirus Disease 2019 in Children—United States, February 12-April 2, 2020. MMWR. [https://www.cdc.gov/mmwr/volumes/69/wr/mm6914e4.htm?s\\_cid=mm6914e4\\_w](https://www.cdc.gov/mmwr/volumes/69/wr/mm6914e4.htm?s_cid=mm6914e4_w)*

- Herold et al found a strong association between elevated interleukin-6 (IL-6) and the need for mechanical ventilation in 40 hospitalized patients. The patients did not differ in age, comorbidities, radiological findings, respiratory rate or qSofa score.
- This suggests that IL-6 is an effective marker that could be used by physicians to predict upcoming respiratory failure and allocate patients at an early stage.

*Herold et al. (Apr 4, 2020). Level of IL-6 predicts respiratory failure in hospitalized symptomatic COVID-19 patients. Pre-print downloaded Apr 6 from <https://doi.org/10.1101/2020.04.01.20047381>*

## Public Health Policy and Practice

- Based on a review of existing evidence on SARS-CoV-2 survivorship and methods to disinfect PPE, in particular N95 filtering facepiece respirators (FFR), the authors propose a two-step disinfection process using initial storage of PP for  $\geq 4$  days, followed by ultraviolet light for N95 FFRs and face shields, dry heat treatment for gowns and chemical disinfection for eyewear.
- This method could be rapidly implemented in healthcare settings, increasing the frontline supply of PPE and avoiding issues of supply chain disruption. In the long term, it could improve the environmental footprint of healthcare facilities by allowing for long-term reuse of PPE.

*Derraik (Apr 6, 2020). Rapid evidence summary on SARS-CoV-2 survivorship and disinfection, and a reusable PPE protocol using a double-hit process. Pre-print downloaded Apr 6 from <https://doi.org/10.1101/2020.04.02.20051524>*

- Findings from this meta-analysis of randomized control trials comparing the protective effect of medical masks to N95 respirators in health care workers suggests that medical masks and N95 respirators offer similar protection against viral respiratory infection during non-aerosol generating procedures.
- The authors recommend preserving N95 respirators for high-risk, aerosol generating procedures when in short supply, as medical masks are less expensive and more readily available.

*Bartoszko et al. (Apr 4, 2020). Medical Masks vs N95 Respirators for Preventing COVID-19 in Health Care Works- A Systematic Review and Meta-Analysis of Randomized Trials. Influenza and other respiratory viruses. <https://doi.org/10.1111/irv.12745>*

## Other Resources and Commentaries

- [Developing antibody tests for SARS-CoV-2](#) – Lancet (Apr 5)
  - This article discusses the many applications of antibody testing and some of the challenges in developing tests and scaling up production quick enough to meet the information needs of policy makers.
- [Clear plastic drapes may be effective at limiting aerosolization and droplet spray during extubation: implications for COVID-19](#)—Canadian Journal of Anesthesia (Apr 3)
  - Based on findings from a series of experiments, the authors recommend the use of clear plastic drapes during extubation (and possibly intubation) of COVID-19 patients by frontline HCWs as an additional precaution.
- [COVID-19 and maternal mental health: Are we getting the balance right?](#) – Preprint (Apr 6)
- [The Coronavirus and the Risks to the Elderly in Long-Term Care](#)—Aging and Social Policy (Apr 3)