



2019-nCoV Literature Situation Report (Lit Rep)

May 22, 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

- **Protective immunity against the spike glycoprotein, the target of many vaccines currently entering clinical trials, was detected after mild to moderate SARS-CoV-2 infection.**
- **Two studies in an independent living facility (Seattle, WA) and a skilled nursing facility (Los Angeles, CA) found that PCR testing reveals asymptomatic older residents in these settings and that repeated PCR testing identifies new cases. Strict infection control measures are needed to prevent and control outbreaks in these settings.**
- **Healthcare workers are experiencing a high burden of burnout, depression, anxiety, and insomnia. Burnout is higher among those who feel pushed beyond their training, have exposure to COVID-19 patients, and feel work negatively affects their other life priorities. Adequate PPE availability was associated with lower burnout.**
- **Google searches related to purchasing new guns or removing guns from storage were 158% higher than expected during the first month of the COVID-19 pandemic in the US and 40% higher than previous spikes following the Sandy Hook, CT and Parkland, FL shootings.**
- **An agent-based model that includes “superspreaders” finds that limiting diffuse social contacts, while maintaining normal home and work contacts, can halt the epidemic.**

Testing and Treatment

- A multinational registry analysis of the use of hydroxychloroquine or chloroquine, with or without a macrolide (e.g., azithromycin), included 671 hospitals and 96,032 hospitalized patients across 6 continents. Patients for whom treatment was not initiated within 48 hours or prior to ventilation were excluded, as were those who received remdesivir.
- After controlling for confounders, including risk factors for severe COVID-19, all four treatment groups were associated with a higher risk of in-hospital mortality, compared with patients who received no treatment: hydroxychloroquine alone HR=1.34 (95%CI 1.22, 1.46), hydroxychloroquine with a macrolide HR=1.45 (95%CI 1.37, 1.53), chloroquine alone HR=1.37 (95%CI 1.22, 1.53), and chloroquine with a macrolide HR=1.37 (95% CI 1.27, 1.47). All four treatments were also associated with strong increased risk of de-novo ventricular arrhythmias.

Mehra et al. Hydroxychloroquine or Chloroquine with or without a Macrolide for Treatment of COVID-19: A Multinational Registry Analysis. The Lancet. [https://doi.org/10.1016/S0140-6736\(20\)31180-6](https://doi.org/10.1016/S0140-6736(20)31180-6)



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Vaccine

- [pre-print, not peer reviewed] Juno et al. found that following mild to moderate SARS-CoV-2 infection, antibody responses against the viral spike protein are routinely elicited and that they are correlate with the ability of blood plasma to block binding to the ACE2 receptor. This has positive implications for vaccine development because several COVID-19 vaccine candidates that are now entering clinical trials are designed to elicit antibodies that target the viral spike glycoprotein.
Juno et al. (May 21, 2020). Immunogenic Profile of SARS-CoV-2 Spike in Individuals Recovered from COVID-19. Pre-print downloaded May 21 from <https://doi.org/10.1101/2020.05.17.20104869>

Clinical Characteristics and Health Care Setting

- Survival data and descriptions of best- and worst-case clinical scenarios were used to create an online COVID-19 Prognostication Tool. The visual infographic tool includes prompts for clinician reflection to enhance awareness of cognitive biases that may affect their prognostic accuracy.
Gibbon et al. (May 2020). Development and Implementation of a Clinician-Facing Prognostic Communication Tool for Patients with COVID-19 and Critical Illness. Journal of Pain and Symptom Management. <https://doi.org/10.1016/j.jpainsymman.2020.05.005>
- [pre-print, not peer reviewed] A retrospective cohort of 2,864 COVID-19 patients discharged from five New York City hospitals found 103 (3.6%) returned for emergency care after a median of 4.5 days, with 56 requiring re-admission. In 50% of cases the reason for return was respiratory distress.
- Patients who returned had a higher burden of COPD and hypertension, had a shorter duration of index hospitalization, and were less likely to require intensive care or to have received anticoagulation during index hospitalization.
- Among those readmitted, 5.8% required intensive care, and 3.6% died.
Somani et al. (May 22, 2020). Characterization of Patients Who Return to Hospital Following Discharge from Hospitalization For COVID-19. Pre-print downloaded May 21 from <https://doi.org/10.1101/2020.05.17.20104604>
- [pre-print, not peer reviewed] Machine learning techniques were applied to clinical data from a cohort of 5,051 COVID-19 patients in New York City to predict mortality (training set of n=3,841). A mortality predictor based on five clinical features (age, minimum oxygen saturation, type of encounter, hydroxychloroquine use, and maximum body temperature) had good predictive performance (AUC=0.91) on a test set of retrospective (n=961) and prospective (n=249) patients.
Yadaw et al. (May 22, 2020). Clinical Predictors of COVID-19 Mortality. Pre-print downloaded May 21 from <https://doi.org/10.1101/2020.05.19.20103036>

Mental Health and Personal Impact

- [pre-print, not peer reviewed] A cross-sectional study of over 2,500 healthcare professionals from 60 countries found 50% self-reported burnout. Burnout was found to be associated with work impacting household activities, feeling pushed beyond training, exposure to COVID-19 patients, and making life prioritizing decisions due to supply shortages. Adequate PPE was associated with lower risk of burnout.
Morgantini et al. (May 22, 2020). Factors Contributing to Healthcare Professional Burnout During the COVID-19 Pandemic A Rapid Turnaround Global Survey. Pre-print downloaded May 21 from <https://doi.org/10.1101/2020.05.17.20101915>

- A systematic literature review that included 13 studies, corresponding to 33,062 healthcare workers, found a pooled prevalence of anxiety of 23%, depression of 23%, and of insomnia of 39%. Female providers and nurses had a higher prevalence of these outcomes. A considerable proportion of healthcare workers are experiencing mood and sleep disturbances during the COVID-19 pandemic. *Pappa et al. (May 2020). Prevalence of Depression, Anxiety, and Insomnia among Healthcare Workers during the COVID-19 Pandemic: A Systematic Review and Meta-Analysis. Brain, Behavior, and Immunity. <https://doi.org/10.1016/j.bbi.2020.05.026>*

Modeling and Prediction

- *[pre-print, not peer reviewed]* Sneppen and Simonsen developed an agent-based model that includes superspreaders (persons who spread the disease far more readily than others) to investigate the effect of containment strategies under different models of population mixing. They found that limiting contacts in settings with diffuse social interactions, such as bars, public transport, or lecture halls, was far more effective than limiting the same amount of contact events in the home and work setting. They conclude that limiting diffuse social contacts, while maintaining normal home and work contacts, could halt the epidemic. *Sneppen and Simonsen. (May 21, 2020). Impact of Superspreaders on Dissemination and Mitigation of COVID-19. Pre-print downloaded May 21 from <https://doi.org/10.1101/2020.05.17.20104745>*

Public Health Policy and Practice

- In March 2020, public health surveillance of staff and residents at an independent living residence for older adults in Seattle, WA revealed 3 of 80 (3.8%) residents (mean age 86 years) and 2 of 62 (3.2%) staff infected with SARS-CoV-2. None of the three residents reported feeling ill, while both staff members were symptomatic. Repeat testing after one week identified one new asymptotically infected resident. All residents were subsequently isolated for 14 days and remained clinically stable.
- These findings demonstrate asymptomatic detection of SARS-CoV-2 among older adults in an independent/assisted living community. This highlights the need for continued social distancing, strict staff screening, and visitor exclusion in these settings, per current CDC guidance. Symptom screening alone is insufficient to prevent transmission in independent/assisted living communities. *Roxby et al. (May 21, 2020). Outbreak Investigation of COVID-19 Among Residents and Staff of an Independent and Assisted Living Community for Older Adults in Seattle, Washington. JAMA Internal Medicine. <https://doi.org/10.1001/jamainternmed.2020.2233>*
- Caputi et al. used an autoregressive integrated moving average model fit to Google search data from January 2004 to the week that COVID-19 was declared an emergency to predict the expected number of gun preparation searches that would have occurred in the absence of the COVID-19 pandemic. They found a 158% (95%CI 73 to 270%) increase over what was expected during a 34-day period, and a 40% increase over previous spikes following the Sandy Hook, CT and Parkland, FL shootings. The increase in searches was higher in states with greater COVID-19 impacts. *Caputi et al. (May 15, 2020). Collateral Crises of Gun Preparation and the COVID-19 Pandemic: An Infodemiology Study. JMIR Public Health and Surveillance. <https://doi.org/10.2196/19369>*

- In March 2020, two residents of a long-term care skilled nursing facility in the Veterans Affairs Greater Los Angeles Healthcare System tested positive for COVID-19. Subsequently, all residents underwent serial (approximately weekly) nasopharyngeal PCR testing and all clinical and nonclinical staff were screened through April 10. Positive test results were found in 19 of 99 (19%) residents and 8 of the 136 (6%) staff. Fourteen of the 19 residents infected residents were asymptomatic for COVID-19 at the time of testing, among whom 8 developed symptoms after specimen collection.
- No further cases were identified on subsequent testing, representing successful containment of the outbreak through case detection by serial PCR testing.

Dora et al. (2020). Universal and Serial Laboratory Testing for SARS-CoV-2 at a Long-Term Care Skilled Nursing Facility for Veterans — Los Angeles, California 2020. MMWR.

<http://dx.doi.org/10.15585/mmwr.mm6921e1>

- Using CDC FluView data, Wiemken and Shacham found a 76% decrease in influenza positive tests and a 27% increase in influenza-like illness in the weeks since COVID-19 was introduced to the US, compared with the previous three influenza seasons. The authors suggest FluView could be used for COVID-19 syndromic surveillance.

Wiemken and Shacham. (May 2020). Identifying Potential Undocumented COVID-19 Using Publicly Reported Influenza-like-Illness and Laboratory-Confirmed Influenza Disease in the United States: An Approach to Syndromic Surveillance? American Journal of Infection Control.

<https://doi.org/10.1016/j.ajic.2020.05.007>

Other Resources and Commentaries

- [COVID-19 and the impact of social determinants of health](#) – Lancet Respiratory Medicine (May 8)
- [Estimating coronavirus disease 2019 infection risk in health care workers](#) – JAMA Network Open (May 21)
- [World leaders adopt resolution to study WHO's response to COVID-19](#) – BMJ (May 20)
- [Connecting hydroxychloroquine in vitro antiviral activity to in vivo concentration for prediction of antiviral effect: a critical step in treating COVID-19 patients](#) – Clinical Infectious Diseases (May 21)
- [Trained Immunity: a Tool for Reducing Susceptibility to and the Severity of SARS-CoV-2 Infection](#) – Cell (May 4)
- [Associations of Early COVID-19 Cases in San Francisco with Domestic and International Travel](#) – Clinical Infectious Diseases (May 21)
- [Preventing COVID-19 in Assisted Living Facilities—A Balancing Act](#) – JAMA Internal Medicine (May 21)
- [Structure of replicating SARS-CoV-2 polymerase](#) – Nature (May 21)

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