2019-nCoV Literature Situation Report (Lit Rep)
November 12, 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 wedding reception in rural Maine was the likely source of subsequent outbreaks in the local community, a long-term care facility 100 miles away, and a correctional facility 200 miles away, with a total of 177 cases and 7 deaths.** More

➢ **Follow-up at 60 days post-discharge of 1,250 patients hospitalized with COVID-19 found 84 additional deaths and 189 rehospitalizations. More than one third of the 488 patients contacted by 60 days reported symptoms such as cough or shortness of breath.** More

➢ **SARS-CoV-2 genetic material was detected in vents within COVID-19 wards and in HEPA filters located several floors above the wards, suggesting long-distance airborne viral dispersion. The samples were not found to be infectious.** More

➢ **Despite 2-week quarantine measures both before and after campus arrival of US Marine Corps recruits, a small percentage (~3%) tested positive during scheduled testing, with evidence of local transmission. No cases were identified through daily symptom monitoring.** More

Transmission

- In an outbreak on an aircraft carrier in late March 2020, 1271 (26.6%) of 4779 crew members had SARS-CoV-2 positive PCR results, and an additional 60 crew members had suspected COVID-19. In this predominantly young (mean age 27 years) population, 23 were hospitalized, 4 received intensive care, and 1 died. Nearly 80% were asymptomatic at time they tested positive, and 55% developed symptoms at any time during the clinical course.

  Kasper et al. (Nov 11, 2020). An Outbreak of Covid-19 on an Aircraft Carrier. New England Journal of Medicine. https://doi.org/10.1056/NEJMoa2019375

- Among a cohort of US Marine Corps recruits who were tested on days 1-2, 7, and 14 after arrival to campus (n=1848), 16 (0.9%) tested positive for SARS-CoV-2 by day 2, followed by 35 more (1.9%) by day 14. Genomic analysis from 32 positive recruits identified 6 clusters among 18 recruits, providing evidence for local transmission events, such as among roommates and platoon-mates. In a separate cohort of recruits only tested on day 14 (n=1554), 26 (1.7%) tested positive.

- All recruits were required to quarantine for 2 weeks prior to campus arrival, then had a 2-week supervised quarantine upon arrival. No cases were identified through daily symptom monitoring.

  Letizia et al. (Nov 11, 2020). SARS-CoV-2 Transmission among Marine Recruits during Quarantine. New England Journal of Medicine. https://doi.org/10.1056/NEJMoa2029717

- Detection of SARS-CoV-2 in the ventilation system of 3 linked COVID-19 wards in a Swedish hospital suggests long-distance airborne dispersal beyond droplet transmission. SARS-CoV-2 genetic material was detected in 7 of 19 vent openings within wards, while 8 of 9 samples obtained from HEPA exhaust filters located several floors above the wards were also positive for genetic material. Inoculation of susceptible cell cultures with the samples did not demonstrate infectious virus at the time of sampling.
  Nissen et al. (Nov 2020). Long-Distance Airborne Dispersal of SARS-CoV-2 in COVID-19 Wards. Scientific Reports. https://doi.org/10.1038/s41598-020-76442-2

- *[Pre-print, not peer reviewed]* In a retrospective study of 167 nursing homes providing long-term care in Spain, the risk of COVID-19 related death was greater in facilities with a higher percentage of complex patients or advanced diseases, lower capacity for implementing preventive measures, and in districts with higher incidence of COVID-19. A higher population density in the catchment area was protective, which may be due to lack of access to critical emergency care in rural areas.
  Suner et al. (Nov 10, 2020). Risk Factors for Mortality of Residents in Nursing Homes with Covid-19 a Retrospective Cohort Study. Pre-print downloaded Nov 12 from https://doi.org/10.1101/2020.11.09.20228171

- An outbreak investigation of a wedding reception in rural Maine attended by 55 people in August 2020 initially identified 30 primary COVID-19 cases, but infected wedding guests were later identified as the likely source of outbreaks in the local community, a long-term care facility 100 miles away, and a correctional facility 200 miles away. Overall, 177 COVID-19 cases were linked to the reception, including 7 hospitalizations and 7 deaths (6 in the long-term care facility).
- The investigation also revealed that the wedding reception exceeded attendee capacity limits and had relaxed enforcement of mask use and physical distancing.
  Mahale et al. (Nov 13, 2020). Multiple COVID-19 Outbreaks Linked to a Wedding Reception in Rural Maine — August 7–September 14, 2020. MMWR. Morbidity and Mortality Weekly Report. https://doi.org/10.15585/mmwr.mm6945a5

Geographic Spread
- A large-scale analysis of 3067 SARS-CoV-2 genomes from 55 countries tracked mutations within the virus genome and identified three major clades in various geographic regions. The analysis also revealed geographic mutation hotspots - in particular, China, the US, France, and Malaysia - contained a high number of specific mutations. The authors note the high number of mutations may be the cause of rapid transmission in the US and may be associated with the severity of the epidemic in the US and France.
  Laamarti et al. (Nov 10, 2020). Large Scale Genomic Analysis of 3067 SARS-CoV-2 Genomes Reveals a Clonal Geo-Distribution and a Rich Genetic Variations of Hotspots Mutations. PLOS ONE. https://doi.org/10.1371/journal.pone.0240345

Vaccines and Immunity
- *[Pre-print, not peer reviewed]* An analysis suggests that prior infection with human coronaviruses other than SARS-CoV-2 is not associated with protection from SARS-CoV-2 infection. The authors found no significant differences in the levels of pre-pandemic human coronavirus antibodies cross-reactive to SARS-CoV-2 proteins between a cohort of people eventually infected with SARS-CoV-2

(n=251) and a matched cohort who was not (n=251). This relationship held even after analyzing a smaller cohort (39 SARS-CoV-2 infected, 57 non-infected) whose pre-pandemic serum samples were collected a year before March 2020.

- Meanwhile, longitudinal analysis of a separate cohort of 27 COVID-19 patients found that SARS-CoV-2 infection boosts antibodies reactive to other human coronaviruses.
  Anderson et al. (Nov 10, 2020). Seasonal Human Coronavirus Antibodies Are Boosted upon SARS-CoV-2 Infection but Not Associated with Protection. Pre-print downloaded Nov 12 from https://doi.org/10.1101/2020.11.06.20227215

- Analysis of longitudinal antibody responses of 76 COVID-19 patients followed for approximately 100 days showed that while anti-spike protein IgG levels declined rapidly for most individuals, those with sustained (and in some instances increased) anti-spike protein IgG levels experienced shorter disease course (median 10 vs. 16 days). Being an antibody "sustainer" also predicted persistent neutralizing antibody responses up to 145 days post-symptom onset.
  Chen et al. (Nov 3, 2020). Quick COVID-19 Healers Sustain Anti-SARS-CoV-2 Antibody Production. Cell. https://doi.org/10.1016/j.cell.2020.10.051

Clinical Characteristics and Health Care Setting

- Among 1,648 hospitalized COVID-19 patients in Michigan, 1250 (75.8%) survived and were discharged between March 16 and July 1, with a majority returning home. By 60 days post-discharge, an additional 84 patients died, bringing the overall mortality rate to 29.2% (63.5% among those admitted to ICU). An additional 189 (15.1%) patients were rehospitalized.
- Among the 488 patients (41.8%) successfully contacted by 60 days post-discharge, 159 (33%) reported cardiopulmonary symptoms and 58 (12%) reported new or worsening difficulty completing daily activities. Among 195 patients employed before hospitalization, 117 (60%) had returned to work and 78 (40%) could not because of ongoing health issues or job loss.
  Chopra et al. (Nov 11, 2020). Sixty-Day Outcomes Among Patients Hospitalized With COVID-19. Annals of Internal Medicine. https://doi.org/10.7326/M20-5661

- Among 384 patients in London followed for an average of 54 days post-discharge from COVID-19 hospitalization, 53% reported persistent breathlessness, 34% cough, 69% fatigue, and 14.6% depression. 38% of chest radiographs remained abnormal and 9% showed signs of worsening.
  Mandal et al. (Nov 10, 2020). 'Long-COVID': A Cross-Sectional Study of Persisting Symptoms, Biomarker and Imaging Abnormalities Following Hospitalisation for COVID-19. Thorax. https://doi.org/10.1136/thoraxjnl-2020-215818

- A systematic review and meta-analysis of 10 studies (n = 11,189 COVID-19 patients) found that smokers had a 2-fold increased risk of mortality compared to non-smokers. There was no difference in mortality risk between current and former smokers.
  Salah et al. (Oct 7, 2020). Smoking Doubles the Mortality Risk in COVID-19: A Meta-Analysis of Recent Reports and Potential Mechanisms. Cureus. https://doi.org/10.7759/cureus.10837

Modeling and Prediction

- A transmission model incorporating mobility networks from neighborhoods to locations of interest suggests a small minority of "superspreader" locations, such as full-service restaurants and hotels,

account for the majority of infections. The mobility networks are derived from cell phone data from 10 large US metropolitan areas. The model also predicts higher infection rates among lower-income groups who did not experience a substantial decrease in mobility and tend to gather in more crowded locations. The authors recommend focusing efforts on superspreader locations rather than applying blanket policies.

> *Chang et al. (Nov 10, 2020). Mobility Network Models of COVID-19 Explain Inequities and Inform Reopening. Nature.* https://doi.org/10.1038/s41586-020-2923-3

- Network modeling parametrized to a large population with an Israeli age distribution (more younger people) and an Italian age distribution (more older people) show that age separation could dramatically reduce COVID-19 mortality. Separating older groups (55+ years old) from the rest of the population and compensating for the loss of social connectivity by adding new connections within age groups could reduce mortality by 62%.

> *Mizrahi et al. (Nov 11, 2020). Age Separation Dramatically Reduces COVID-19 Mortality Rate in a Computational Model of a Large Population. Open Biology.* https://doi.org/10.1098/rsob.200213

Other Resources and Commentaries

- What We Can Learn from Information Flows about COVID-19: Implications for Research and Practice – Proceedings of the Association for Information Science and Technology (Oct 22)
- Bringing Research Directly to Families in the Era of COVID-19 – Pediatric Research (Nov 11)
- The Urgent Need for Research Coordination to Advance Knowledge on COVID-19 in Children – Pediatric Research (Nov 11)
- Russia Announces Positive COVID-Vaccine Results from Controversial Trial – Nature (Nov 11)
- Call to Action: Structural Racism as a Fundamental Driver of Health Disparities: A Presidential Advisory From the American Heart Association – Circulation (Nov 10)
- COVID-19, Indications for Professional Football Teams and Referees Training Resumption – The Journal of Infection in Developing Countries (Oct 31)
- Stigmatization in Social Media: Documenting and Analyzing Hate Speech for COVID-19 on Twitter – Proceedings of the Association for Information Science and Technology (Oct 22)
- The Great Coronavirus Pandemic of 2020—7 Critical Lessons – JAMA (Nov 10)
- Adolescent Mental Health, COVID-19, and the Value of School-Community Partnerships – Injury Prevention (Nov 10)
- COVID-19 Deaths Among US Clinicians – JAMA (Nov 10)
- Why Do COVID Death Rates Seem to Be Falling? – Nature (Nov 12)
- Labor Issues in the Food Supply Chain Amid the COVID-19 Pandemic – Applied Economic Perspectives and Policy (Sept 21)
- Big Data and Simple Models Used to Track the Spread of COVID-19 in Cities – Nature (Nov 10)
- Social Determinants of Health and Health Disparities: COVID-19 Exposures and Mortality Among African American People in the United States – Public Health Reports (Nov 11)
- SARS-CoV-2 in the U.S. Military — Lessons for Civil Society – New England Journal of Medicine (Nov 11)
- Online Trade in Wildlife and the Lack of Response to COVID-19 – Environmental Research (Nov 7)
- Are Asylum Seekers, Refugees and Foreign Migrants Considered in the COVID-19 Vaccine Discourse? – BMJ Global Health (Nov 11)

- [Transmission of SARS-CoV-2 on Mink Farms between Humans and Mink and Back to Humans](#) – Science (Nov 10)
- [Reflections of a COVID-19 Long Hauler](#) – JAMA (Nov 11)
- [Joe Biden's COVID Plan Is Taking Shape — and Researchers Approve](#) – Nature (Nov 11)

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

Updated 11/12/2020