2019-nCoV Literature Situation Report (Lit Rep)
October 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

- **Oxygen saturation did not decline among adults over age 65 years while they wore non-medical face masks.** More
- **SARS-CoV-2 infections were found in 53% of household contacts of index cases in Tennessee and Wisconsin, with similar risk of secondary infection between index cases who were adults and those under age 18 years. 75% of secondary infections occurred within 5 days of the index patient's onset of illness and only 40% of secondary cases were symptomatic at the time of detection by RT-PCR. More**
- **Healthcare personnel in Minnesota who were working in congregate living or long-term care settings were less likely to wear appropriate PPE, more likely to work while symptomatic, and more likely to receive a positive test result during 14-day post-exposure monitoring, compared with healthcare personnel working in acute care settings. More**

Non-Pharmaceutical Interventions

- Wearing a 3-layer non-medical face mask was not associated with a decline in oxygen saturation among adults over 65 in a small (n=25) crossover study. Study participants were provided with a mask and pulse oximeter and were instructed to measure their peripheral oxygen saturation (Spo_2) three times, twenty minutes apart for one hour before, one hour while, and one hour after wearing the mask. The pooled mean Spo_2 measurements were 96.1% before, 96.5% while, and 96.3% after wearing the mask. The paired mean differences in Spo_2 for each participant while wearing the mask were minimal when compared with the value before mask wearing (0.46%) and the value after wearing the mask (0.21%), and none of the participants' Spo_2 readings fell below 92% while wearing masks.

  Chan et al. (Oct 30, 2020). Peripheral Oxygen Saturation in Older Persons Wearing Nonmedical Face Masks in Community Settings. JAMA. https://doi.org/10.1001/jama.2020.21905

- *[Pre-print, not peer-reviewed]* Missouri counties with mask mandates had a daily percent COVID-19 growth rate that was 32% lower than the growth rate in counties without mask mandates, based on a population-based quasi-experimental longitudinal study conducted from June to September. In the 3 weeks before mandatory mask mandates were instated, the average daily percent increase in incident COVID-19 cases was similar across all counties (0.9% vs. 1.3%). At 12 weeks post-mask mandate, the average daily COVID-19 case growth in counties with no mandate was 2.4%, which was significantly higher than the average daily COVID case growth among counties with a mandate (1.4%). Following implementation of mask mandates, disparities in infection rate by race and population density were no longer significant.

Shacham et al. (Oct 30, 2020). Association of County-Wide Mask Ordinances with Reductions in Daily CoVID-19 Incident Case Growth in a Midwestern Region Over 12 Weeks. Pre-print downloaded Oct 30 from https://doi.org/10.1101/2020.10.28.20221705

Transmission

- A March 2020 outbreak of SARS-CoV-2 in a nursing home in the Netherlands following a church service in the nursing home chapel revealed a complex chain of transmission involving the church service, regional circulation of the virus before the outbreak, and several introductions of the virus into the nursing home by visitors. The investigation indicated that the church service itself may have played a smaller role as a source of the outbreak than initially believed and that transmission pattern was consistent with widespread regional circulation of the virus in the weeks before the outbreak. After the service, 77% of attendees developed symptoms, and 14 were positive for SARS-CoV-2, including 11 nursing home residents and 3 non-residents. In the following five weeks, 21% of residents and 5% of healthcare workers tested positive, and 34% of the infected residents died. Whole genome sequencing of samples from residents and health care workers indicated that seven resident church attendees were infected with distinct viruses, four of which belonged to two larger clusters in the nursing home.

  Voeten et al. (Oct 29, 2020). Unravelling the Modes of Transmission of SARS-CoV-2 during a Nursing Home Outbreak: Looking beyond the Church Super-Spread Event. Clinical Infectious Diseases. https://doi.org/10.1093/cid/ciaa1664

- A study of household SARS-CoV-2 transmission conducted in Tennessee and Wisconsin indicated that the secondary infection rate among household contacts overall was 53%, and that 75% of secondary infections occurred within 5 days of the onset of the index patient's illness. Fewer than half of household members with confirmed SARS-CoV-2 infections reported symptoms at the time infection was first detected, and many reported no symptoms throughout 7 days of follow-up. Among households in which the index patient was under 18 years old, the secondary infection rate from index patients under 12 was 53%; from index patients 12 to 17, it was 38%. These results are based an analysis of 101 index patients and 191 household members.

  Grijalva et al. (Oct 30, 2020). Transmission of SARS-COV-2 Infections in Households — Tennessee and Wisconsin, April–September 2020. MMWR. https://doi.org/10.15585/mmwr.mm6944e1

Testing and Treatment

- *[Pre-print, not peer-reviewed]* A novel reverse complement polymerase chain reaction (RC-PCR) technology for whole genome sequencing of SARS-CoV-2 was evaluated as a means of supporting SARS-CoV-2 monitoring by potentially saving time and resources. RC-PCR whole genome sequencing showed a genome coverage of up to 98.2% for samples with a maximum Ct value of 32. Six clusters containing samples from healthcare workers and patients were examined, and half of the suspected clusters were fully confirmed, while in other clusters four healthcare workers were not associated. A previously unknown chain of transmission was also identified in the public health service samples.

  Wolters et al. (Oct 29, 2020). Novel SARS-CoV-2 Whole-Genome Sequencing Technique Using Reverse Complement PCR Enables Fast and Accurate Outbreak Analysis. Pre-print downloaded Oct 30 from https://doi.org/10.1101/2020.10.29.360578

Clinical Characteristics and Health Care Setting

- Compared to healthcare personnel with higher-risk exposures working in acute care settings, those working in congregate living or long-term care settings were less likely to wear appropriate PPE, more often returned to work during 14-day post-exposure monitoring (57%), more often worked while symptomatic (5%), and were more likely to receive a positive test result during 14-day post-exposure monitoring.

- Among Minnesota healthcare personnel, higher-risk exposures to a patient with COVID-19 involved direct patient care (66%) and nonpatient care interactions (e.g., with coworkers and social and household contacts) (34%). Among those with exposure to individuals positive for SARS-CoV-2, 25% of such exposures were classified as higher-risk.

  Fell et al. (Oct 30, 2020). SARS-CoV-2 Exposure and Infection Among Health Care Personnel — Minnesota, March 6–July 11, 2020. MMWR. https://doi.org/10.15585/mmwr.mm6943a5

- A decision analytical model for COVID-19 found that resuming unrestricted construction work during shelter-in-place orders in Texas was associated with a higher risk of community hospitalizations due to SARS-CoV-2 (0.38 to 1.5 per 1000 residents) and increased risk of hospitalization of workers (0.22 to 9.3 per 1000 construction workers). Construction workers in central Texas had a nearly 5-fold higher risk of hospitalization compared with other occupational categories among adults aged 18 to 64 years (RR=4.9). Safety measures such as thorough cleaning of equipment, use of PPE, and limiting numbers of works at a given site were associated with a 50% decrease in transmission.

  Pasco et al. (Oct 29, 2020). Estimated Association of Construction Work With Risks of COVID-19 Infection and Hospitalization in Texas. JAMA Network Open. https://doi.org/10.1001/jamanetworkopen.2020.26373

- A study of SARS-CoV-2 antigen test turnaround times among Medicare-certified skilled nursing facilities (SNFs) found that although testing delays improved over time in the study period, few SNF across the US received test results in less than 24 hours. In early September, test turnaround time was less than 1 day for 6% of SNFs testing staff and 5% for testing residents. By late September, the proportions rose to 14% and 10%, respectively. In hotspot counties where facilities should have received point-of-care testing instruments from Medicare by mid-August, less than 17% of SNFs had a turnaround of less than 24 hours. The authors note that the state of testing at the end of the study was behind what epidemiological modeling suggests is key to preventing outbreaks.

  McGarry et al. (2020). COVID-19 Test Result Turnaround Time for Residents and Staff in US Nursing Homes. JAMA Internal Medicine. https://doi.org/10.1001/jamainternmed.2020.7330

- A meta-analysis of the case fatality ratio among adults with COVID-19 receiving invasive mechanical ventilation (IMV) indicated that the estimated case fatality ratio was 45% (95% CI 39-52%). Among studies where age-specific case fatality ratios were available, pooled estimates ranged from 48% in younger patients (age ≤40) to 84% in older patients (age >80). Case fatality ratios were also higher in early epicenters. The authors note that overall heterogeneity was high and that variable reporting methods resulted in a wide range of estimates between studies.

  Lim et al. (Oct 29, 2020). Case Fatality Rates for COVID-19 Patients Requiring Invasive Mechanical Ventilation: A Meta-Analysis. American Journal of Respiratory and Critical Care Medicine. https://doi.org/10.1164/rccm.202006-2405OC

- Updates to a living systematic review of the rehabilitation needs of patients with COVID-19 found that there was evidence to suggest that rehabilitation, including pulmonary rehabilitation, should be recommended to patients with COVID-19 during acute illness. In addition, while prone positioning was found to be associated with lower mortality than positioning patients in the semi-prone position, it may increase the rate of peripheral nerve injury or other complications. Malnutrition was identified as a preventable complication associated with ICUs most frequently, but was also reported in rehabilitation units. The authors note that studies with higher levels of evidence pertaining to intervention efficacy and long-term monitoring are needed.

  Andrenelli et al. (Oct 29, 2020). Rehabilitation and COVID-19: A Rapid Living Systematic Review 2020 by Cochrane Rehabilitation Field. Update as of September 30th, 2020. European Journal of Physical and Rehabilitation Medicine. https://doi.org/10.23736/S1973-9087.20.06672-1

Modeling and Prediction

- *[Pre-print, not peer-reviewed]* Findings from a study using a dynamic compartmental model of COVID-19 transmission for the four most severely affected states (New York, Texas, Florida, and California) indicated that in the absence of a vaccine, SARS-CoV-2 transmission could be slowed in these states by adherence to strict social distancing guidelines and widespread face mask use. Without such preventive measures, 0.8-4 million infections and 15,000-240,000 deaths were projected across the four states over the next 12 months. The study also evaluated varying levels of vaccine efficacy and face mask use that would be required to suppress the epidemic, and the authors concluded that the efficacy of a future vaccine will largely determine the degree to which the US can relax social distancing and mask requirements.

  Shen et al. (Oct 30, 2020). Projected COVID-19 Epidemic in the United States in the Context of the Effectiveness of a Potential Vaccine and Implications for Social Distancing and Face Mask Use. Pre-print downloaded Oct 30 from https://doi.org/10.1101/2020.10.28.20221234

- *[Pre-print, not peer-reviewed]* A study simulating a seated indoor mass gathering event (MGE) found that in scenarios where hygiene protocols and ventilation were good, 0 to 23% of subsequent cases of SARS-CoV-2 were attributable to the MGE. All participants in the simulation wore N95 masks, and three different hygiene protocols were evaluated, ranging from no restrictions to strong restrictions, including increased seat distance and more event entrances. The authors suggest that if strict protocols are followed, the impact of MGEs on transmission could be low, but MGEs without precautions may have substantial contributions to epidemic spread.

  Moritz et al. (Oct 30, 2020). The Risk of Indoor Sports and Culture Events for the Transmission of COVID-19 (Restart-19). Pre-print downloaded Oct 30 from https://doi.org/10.1101/2020.10.28.20221580

Other Resources and Commentaries

- On the temporal spreading of the SARS-CoV-2 – PLOS ONE (Oct 2020)
- Clinical care of pregnant and postpartum women with COVID-19: Living recommendations from the National COVID-19 Clinical Evidence Taskforce – Australian and New Zealand Journal of Obstetrics and Gynaecology (Oct 2020)
- COVID-19 transmission—up in the air – The Lancet Respiratory Medicine (Oct 2020)
- To Treat or Not to Treat—Balancing Benefits and Risks of Treatment Delay Among Patients With Cancer During the COVID-19 Pandemic – JAMA Oncology (Oct 2020)
- Populist Nationalism Threatens Health and Human Rights in the COVID-19 Response – American Journal of Public Health (Oct 2020)
- Does the COVID-19 pandemic provide an opportunity to eliminate the tobacco industry? – The Lancet Global Health
- Challenges of drug development during the COVID-19 pandemic: key considerations for clinical trial designs – British Journal of Clinical Pharmacology (Oct 2020)

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