2019-nCoV Literature Situation Report (Lit Rep)

May 21, 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

- **SARS-CoV-2 infection induced protective immunity against re-infection in nonhuman primates.**
- **Stay-at-home policies are associated with a high prevalence of depression symptoms, anxiety and self-reported loneliness among adults in the US.**
- **Agent-based modeling suggests that institution-based isolation at quarantine facilities is more effective at reducing household and community transmission compare to isolation at home.**
- **Sunlight inactivates 99% of infectious SARS-CoV-2 virus after 6.8 minutes when suspended in saliva, and after 14.3 minutes when suspended in culture media.**
- **A wedding with only one presumed index case led to a large outbreak of COVID-19 in Jordan (76 of 350 guests), demonstrating the high communicability of SARS-CoV-2 and the enormous risk of transmission during mass gatherings.**

Non-Pharmaceutical Interventions

- *[pre-print, not peer reviewed]* Pei et al. estimated that if non-pharmaceutical interventions in the U.S. had been implemented 1-2 weeks earlier, then 62% (95% CI: 55%-68%) of reported COVID-19 infections and 55% (95% CI: 46%-62%) of reported deaths would have been averted. The authors also estimated that longer delays in re-implementing social distancing following a relaxation of control measures could result in a stronger rebound of infections and death.

  Pei et al. (May 20, 2020). Differential Effects of Intervention Timing on COVID-19 Spread in the United States. Pre-print downloaded May 21 from https://doi.org/10.1101/2020.05.15.20103655

- Using an agent-based model, Dickens et al. found that institution-based isolation (in which confirmed cases are isolated at quarantine facilities) was more effective at reducing household and community transmission than home-based isolation.

  Dickens et al. (Apr 29, 2020). Institutional, Not Home-Based, Isolation Could Contain the COVID-19 Outbreak. Lancet. https://doi.org/10.1016/S0140-6736(20)31016-3

- Simulated sunlight rapidly inactivates SARS-CoV-2 that is suspended in simulated saliva, culture media, and dried on stainless steel surfaces. 99% of infectious virus was inactivated after 6.8 minutes in saliva and 14.3 minutes in culture media. These findings indicate exposure risk may vary between indoor and outdoor environments.

  Ratnesar-Shumate et al. (May 20, 2020). Simulated Sunlight Rapidly Inactivates SARS-CoV-2 on Surfaces. The Journal of Infectious Diseases. https://doi.org/10.1093/infdis/jiaa274

Transmission

- A wedding with only one presumed index case led to a large outbreak of COVID-19 in Jordan: 76 (22%) of the 350 wedding guests tested positive for SARS-CoV-2, 40 (53%) of whom were symptomatic and 36 (47%) were asymptomatic at diagnosis. This event demonstrates the high communicability of SARS-CoV-2 and the enormous risk of virus transmission during mass gatherings.

  Yusef et al. (May 20, 2020). Large Outbreak of Coronavirus Disease among Wedding Attendees, Jordan. Emerging Infectious Diseases. https://doi.org/10.3201/eid2609.201469

Geographic Spread

- As of April 10, there were 861 COVID-19 cases across 287 American Indian Reservations and tribal homelands in the lower 48 US states. Ecological analysis found incidence was higher in communities with larger proportions of non-English speaking households and houses without indoor plumbing.

  Rodriguez-Lonebear et al. (2020). American Indian Reservations and COVID-19. Journal of Public Health Management and Practice. https://doi.org/10.1097/PHH.0000000000001206

- Huang et al. found 60% of confirmed COVID-19 cases occurred in locations where the air temperature ranged from 5-15 degrees C (41-59 degrees F) and 74% of cases were concentrated in regions with absolute humidity of 3-10g/m^3. These findings suggest that there may be an optimal climate in which of SARS-CoV-2 survives in the ambient environment (e.g. on surfaces).

  Huang et al. (May 16, 2020). Optimal Temperature Zone for the Dispersal of COVID-19. The Science of the Total Environment. https://doi.org/10.1016/j.scitotenv.2020.139487

Testing and Treatment

- *[pre-print, not peer reviewed]* Macias et al. conducted a retrospective analysis of 722 patients with autoimmune rheumatic diseases who were being treated with (n=423) and without hydroxychloroquine (n=290) in Seville, Spain. Incidence and severity of COVID-19 did not differ between the treatment groups. Over seven weeks, 5 (1.7%) cases of COVID-19 were reported among patients using hydroxychloroquine and 5 (1.2%) among those without hydroxychloroquine.

  Macias et al. (May 20, 2020). Similar Incidence of Coronavirus Disease 2019 (COVID-19) in Patients with Rheumatic Diseases with and without Hydroxychloroquine Therapy. Pre-print downloaded May 21 from https://doi.org/10.1101/2020.05.16.20104141

- In February 2020, 10 laboratories in Europe reported that commercial primer and probe batches used for SARS-CoV-2 RT-PCR tests were contaminated with synthetic control material. This caused a 7-14 day delay of regional testing roll-out in various countries.

  Mogling et al. (May 20, 2020). Delayed Laboratory Response to COVID-19 Caused by Molecular Diagnostic Contamination. Emerging Infectious Diseases. https://doi.org/10.3201/eid2608.201843

- *[pre-print, not peer reviewed]* Siordia et al. conducted a systematic review and identified 17 COVID-19 treatment trials with viral clearance and clinical outcomes. Favipiravir had a positive impact on symptoms compared to other medications. Lopinavir/ritonavir, hydroxychloroquine, and arbidol (umifenovir) had no statistically significant effects on viral clearance. There was no significant clinical improvement with lopinavir/ritonavir, arbidol, hydroxychloroquine, or remdesivir.

  Siordia et al. (May 20, 2020). Systematic and Statistical Review of Coronavirus Disease 19 Treatment Trials. Pre-print downloaded May 21 from https://doi.org/10.1101/2020.05.16.20102095

Clinical Characteristics and Health Care Setting

- Among 57 SARS-CoV-2 positive patients admitted to a children's hospital in China, 20 (35%) were infants and 37 (65%) were children and adolescents. Although the mean nasopharyngeal viral load was higher in infants (21.1 vs. 27.3 Ct, p-value < 0.001), a lower proportion of infants had severe disease: 1 (5%) infant compared to 12 (32%) of older children (p=0.02).

  Zachariah et al. (May 20, 2020). Symptomatic Infants Have Higher Nasopharyngeal SARS-CoV-2 Viral Loads but Less Severe Disease than Older Children. Clinical Infectious Diseases. https://doi.org/10.1093/cid/ciaa608

- Lan et al. found work-related transmission likely played a large role in early SARS-CoV-2 outbreaks (48% of 690 cases within the first 40 days of outbreaks in 6 Asian settings). Occupation groups with the most confirmed cases were healthcare workers (22%), drivers/transport workers (18%), services and sales workers (18%), cleaning and domestic workers (9%) and public safety workers (7%).

  Lan et al. (May 19, 2020). Work-Related COVID-19 Transmission in Six Asian Countries/Areas: A Follow-up Study. PloS One. https://doi.org/10.1371/journal.pone.0233588

Mental Health and Personal Impact

- An online survey conducted among younger (age 18-35) and older adults (age 65-81) in the US found older adults perceived a higher risk of COVID-19 compared to younger adults. Despite this, older men implemented the fewest behavior changes and were less worried about COVID-19 than the younger respondents.

  Barber and Kim. (May 19, 2020). COVID-19 Worries and Behavior Changes in Older and Younger Men and Women. The Journals of Gerontology: Series B. https://doi.org/10.1093/geronb/gbaa068

- *[pre-print, not peer reviewed]* A cross-sectional study was conducted among 464 non-healthcare-related Connecticut residents after implementation of stringent state-wide stay-at-home directives. Half of respondents reported high levels of anxiety due to COVID-19. Anxiety was higher among those with higher levels of COVID-19 knowledge (OR-1.2) and those who were married (OR 1.8). 48% of respondents reported increased loneliness and loneliness was more common at older ages.

  Ha et al. (May 20, 2020). Early Assessment of Knowledge Attitudes Anxiety and Behavioral Adaptations of Connecticut Residents to COVID-19. Pre-print downloaded May 21 from https://doi.org/10.1101/2020.05.18.20082073

- *[pre-print, not peer reviewed]* In a nationally representative cross-sectional online survey of US adults (N=1,010). One-third of participants reported depressive symptoms.
- Depressive symptoms were more commonly reported by women, those who were unmarried, had low-income, and were age 20-29. Frequent in-person social connections (e.g. hugging family members) and sexual connections (e.g. partnered sexual activity, dating app use) were associated with lower depression and loneliness. Frequent remote connections (e.g. video chats) were not associated with lower depression or loneliness.

  Rosenberg et al. (May 20 ,2020). Depression and Loneliness during COVID-19 Restrictions in the United States and Their Associations with Frequency of Social and Sexual Connections. Pre-print downloaded May 21 from https://doi.org/10.1101/2020.05.18.20101840

Modeling and Prediction

- Compared to continuous and intermittent social distancing, Kennedy et al. found that a "stepping-down" strategy was the best long-term strategy to minimize the peak number of active COVID-19 cases and associated deaths. The stepping down strategy modeled cycles of restriction and loosening of social distancing behaviors. A stepping-down strategy also reduced the total required social distancing time by 6.5% compared to the other strategies. An 80-day period of social distancing was more effective than a 40-day period. However, these results depend on 50% of people engaging in personal protection measures (e.g., wearing a facemask, proper hand hygiene).

  Kennedy et al. (May 10, 2020). Modeling the Effects of Intervention Strategies on COVID-19 Transmission Dynamics. Journal of Clinical Virology. https://doi.org/10.1016/j.jcv.2020.104440

- Peak et al. modeled the relative efficacy of individual quarantine and active monitoring of contacts to control SARS-CoV-2 transmission. Modeling simulations suggest that individual quarantine could contain an outbreak of COVID-19 in 4.8 days in 84% of simulations, but only in settings with high intervention performance (e.g., 75% of infected contacts are individually quarantined).
- The burden of the number of contacts traced for active monitoring or quarantine increases in settings in which the outbreak continues to grow. If physical distancing reduces R_0 to be below 1.25, then active monitoring of 50% of contacts can result in overall outbreak control.

  Peak et al. (May 20, 2020). Individual Quarantine versus Active Monitoring of Contacts for the Mitigation of COVID-19: A Modelling Study. The Lancet Infectious Diseases. https://doi.org/10.1016/S1473-3099(20)30361-3

Vaccines

- Chandrashekar et al. found that SARS-CoV-2 infection induced protective immunity against re-infection in nonhuman primates.

  Chandrashekar et al. (May 20, 2020). SARS-CoV-2 Infection Protects against Rechallenge in Rhesus Macaques. Science. https://doi.org/10.1126/science.abc4776

Public Health Policy and Practice

- Haroon and Rizvi found that panic about the coronavirus pandemic generated by news outlets was associated with increasing volatility in the equity markets. Specifically, panic-laden news was associated with greater market volatility in sectors perceived to be most affected by outbreak.

  Haroon and Rizvi. (May 15, 2020). COVID-19: Media Coverage and Financial Markets Behavior—A Sectoral Inquiry. Journal of Behavioral and Experimental Finance. https://doi.org/10.1016/j.jbef.2020.100343

- Magnani et al. estimated an excess of 45,033 deaths in Italy, compared to 21,046 reported deaths associated with COVID-19. Relative to the expected number of deaths during the study period, the estimated excess mortality during the COVID-19 pandemic was 11% for people under the age of 60, and 55% for people age 60 and older.

  Magnani et al. (May 15, 2020). How Large Was the Mortality Increase Directly and Indirectly Caused by the COVID-19 Epidemic? An Analysis on All-Causes Mortality Data in Italy. International Journal of Environmental Research and Public Health. https://doi.org/10.3390/ijerph17103452

Other Resources and Commentaries

- Mobile Health Clinic Model in the COVID-19 Pandemic: Lessons Learned and Opportunities for Policy Changes and Innovation – International Journal for Equity in Health (May 19)
- Potent Neutralizing Antibodies against SARS-CoV-2 Identified by High-Throughput Single-Cell Sequencing of Convalescent Patients' B Cells – Cell (May 18)
- Vexing, Veiled, and Inequitable: Social Distancing and the "Rights" Divide in the Age of COVID-19 – The American Journal of Bioethics (May 19)
- A Novel Synonymous Mutation of SARS-CoV-2: Is This Possible to Affect Their Antigenicity and Immunogenicity? – Vaccines (May 14)
- The Lockdowns Worked-but What Comes Next? – Science (Apr 17)
- How to Discover Antiviral Drugs Quickly – New England Journal of Medicine (May 20)
- Nasal ACE2 Levels and COVID-19 in Children – JAMA (May 20)
- How the Coronavirus Pandemic Slashed Carbon Emissions - in Five Graphs – Nature (May 20)
- Coronavirus Contact-Tracing Apps: Can They Slow the Spread of COVID-19? – Nature (May 19)
- High COVID-19 Attack Rate Among Attendees at Events at a Church — Arkansas, March 2020 – MMWR (May 19)

Report prepared by the UW MetaCenter for Pandemic Preparedness and Global Health Security and the START Center in collaboration with and on behalf of WA DOH COVID-19 Incidence Management Team