2019-nCoV Literature Situation Report (Lit Rep)

July 15, 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 phase 1, dose-escalation, open-label trial of the candidate vaccine mRNA-1273 among 45 healthy adults found that all participants had serum neutralizing antibody activity after the second vaccination. No trial-limiting safety concerns were identified.** More
- **Self-reported contact surveys and wearable proximity sensors were highly correlated methods for capturing person-to-person contact patterns relevant to respiratory virus transmission among 730 schoolchildren in the Pittsburgh metropolitan area.** More
- **Updated COVID-19 forecasts from the Institute for Health Metrics and Evaluation estimated that the cumulative mortality in the US could reach 430,494 by the end of 2020. Their model indicates that universal mask use may prevent nearly 25% of the estimated deaths.** More
- **A neonate born to a mother infected in the third trimester was confirmed to have transplacental transmission of SARS-CoV-2.** More

Non-Pharmaceutical Interventions

- *[Preprint, not peer-reviewed]* Grantz et al. compared data from self-reported contact surveys and wearable proximity sensors from 730 schoolchildren in the Pittsburgh metropolitan area. The two methods produced highly correlated data on age-specific mixing patterns relevant to the dynamics of respiratory virus transmission. The results from the methods differed in that participants reported fewer but longer contacts in surveys relative to the generally short proximal interactions captured by wearable sensors.

  Grantz et al. (July 14, 2020). Age-Specific Social Mixing of School-Aged Children in a US Setting Using Proximity Detecting Sensors and Contact Surveys. Pre-print downloaded July 15 from https://doi.org/10.1101/2020.07.12.20151696

Transmission

- Vivanti et al. demonstrated a transplacental transmission of SARS-CoV-2 in a neonate born to a mother infected in the third trimester and delivered at the Paris Saclay University Hospitals. RT-PCR testing for SARS-CoV-2 was positive from multiple sites from the neonate, including blood, bronchoalveolar lavage fluid, nasopharyngeal and rectal swabs, and placental samples. The neonate presented with neurological manifestations, similar to those described in adult patients.

  Vivanti et al. (Dec 14, 2020). Transplacental Transmission of SARS-CoV-2 Infection. Nature Communications. https://doi.org/10.1038/s41467-020-17436-6

Testing and Treatment

- Detection of SARS-CoV-2 RNA was reported in 21 samples from aircraft and cruise ship wastewater sanitation systems (adsorption-extraction by electronegative membrane [n=13] and ultrafiltration by Amicon [n=8]). Concentrations were near the limit of detection for the assay. Findings suggested the surveillance of wastewater from large transport vessels with their own sanitation systems could be a complementary data source to prioritize clinical testing and contact tracing among disembarking passengers.

  Ahmed et al. (July 14, 2020). Detection of SARS-CoV-2 RNA in Commercial Passenger Aircraft and Cruise Ship Wastewater: A Surveillance Tool for Assessing the Presence of COVID-19 Infected Travelers. Journal of Travel Medicine. https://doi.org/10.1093/jtm/taaa116

- An ecological study conducted by Klinger et al. find a strong negative correlation between the years of BCG administration and the deaths per million from COVID-19 based on data from 55 countries. Countries with BCG immunization policies over the past 15 years have a significantly lower rate of COVID-19 deaths than countries with no BCG in last 15 years (p=0.0004). *[EDITORIAL NOTE: Results from ecological studies should be interpreted with caution due to unmeasured confounding between countries and may not reflect individual-level effects]*

  Klinger et al. (July 11, 2020). Significantly Improved COVID-19 Outcomes in Countries with Higher BCG Vaccination Coverage: A Multivariable Analysis. Vaccines. https://doi.org/10.3390/vaccines8030378

- *[Preprint, not peer-reviewed]* A systematic review (32 studies with 1,023 SARS-CoV-2 infected patients) showed the highest percentage of detection of SARS-CoV-2 by RT-PCR was from nasopharyngeal sampling between 0 to 4 days post-symptom onset at 89% (95%CI 83%-93%). The percentage dropped to 54% (95%CI 47%-61%) after 10 to 14 days. Up to 30% of participants with SARS-CoV-2 detected in respiratory samples did not have detectable fecal samples.

  Mallett et al. (July 14, 2020). At What Times during Infection Is SARS-CoV-2 Detectable and No Longer Detectable Using RT-PCR Based Tests A Systematic Review of Individual Participant Data. Pre-print downloaded July 15 from https://doi.org/10.1101/2020.07.13.20152793

- Based on a sample of 172 suspected cases of SARS-CoV-2 and 795 negative plasma samples, IgG antibody testing had a 100% specificity (0/795) and IgG tests were positive for 83% of suspected cases among samples collected more than 14 days from symptom onset.
- There was no association between the level of IgG and IgM reactivity and mild versus severe disease course.

  Phipps et al. (July 15, 2020). SARS-CoV-2 Antibody Responses Do Not Predict COVID-19 Disease Severity. American Journal of Clinical Pathology. https://doi.org/10.1093/ajcp/aqaa123

Vaccines

- The candidate vaccine mRNA-1273 was shown to induce antibody and T-cell immune responses in all participants (n=45).
- Jackson et al. conducted a phase 1, dose-escalation, open-label trial including 45 healthy adults, to test the candidate vaccine mRNA-1273 encoding the stabilized prefusion of SARS-CoV-2 spike protein. Participants received two vaccinations, 28 days apart in three dose groups.

- After the first vaccination, antibody responses were higher among those who received the higher dose. After the second vaccination, the titers increased and all participants had serumneutralizing activity. No trial-limiting safety concerns were identified.

  Jackson et al. (July 14, 2020). An MRNA Vaccine against SARS-CoV-2 — Preliminary Report. New England Journal of Medicine. https://doi.org/10.1056/NEJMoa2022483

Clinical Characteristics and Health Care Setting

- A multicenter study in the US compared 37 inpatients with cirrhosis and COVID-19 to age- and gender-matched patients with COVID-19 alone (n=108) or cirrhosis alone (n=127). Results showed that patients with cirrhosis and COVID-19 had a non-significantly higher mortality compared to patients with cirrhosis alone (30% vs 20%, p=0.16), and significantly higher mortality than patients with COVID-19 alone (30% vs 13%, p=0.03). The elevated mortality among those with cirrhosis and COVID-19 may be at least partially attributable to a higher degree of co-morbidities, as measured by the Charlson Comorbidity Index.

  Bajaj et al. (July 13, 2020). Comparison of Mortality Risk in Patients with Cirrhosis and COVID-19 Compared with Patients with Cirrhosis Alone and COVID-19 Alone: Multicentre Matched Cohort. Gut. https://doi.org/10.1136/gutjnl-2020-322118

- Among 9,850 health care workers Massachusetts between March 1 and April 30, 2020 13% were positive for SARS-CoV-2 by RT-PCR. Prior to implementation of universal masking (March 1-24, 2020), the SARS-CoV-2 positivity rate increased exponentially from 0% to 21%, with a case doubling time of 3.6 days (95%CI 3.0-4.5 days). After implementation of universal masking (April 11-30, 2020), the positivity rate decreased linearly from 14.7% to 11.5%, with a weighted mean decline of 0.49% per day.

  Wang et al. (July 14, 2020). Association Between Universal Masking in a Health Care System and SARS-CoV-2 Positivity Among Health Care Workers. JAMA. https://doi.org/10.1001/jama.2020.12897

Mental Health and Personal Impact

- In a nationally representative sample of 1,041 adults from the general population of the Republic of Ireland, the rate of COVID-19-related posttraumatic stress disorder (PTSD) was 18%. Of individuals who screened positive for PTSD, 54% met the criteria for depression, 50% for generalized anxiety disorder, and 60% for either depression or anxiety. COVID-19-related PTSD was associated with younger age, male sex, living in a city, living with children, and moderate and high perceived risk of COVID-19 infection.

  Karatzias et al. (July 13, 2020). Posttraumatic Stress Symptoms and Associated Comorbidity During the COVID-19 Pandemic in Ireland: A Population-Based Study. Journal of Traumatic Stress. https://doi.org/10.1002/jts.22565

Modeling and Prediction

- *[Preprint, not peer-reviewed]* The Institute for Health Metrics and Evaluation (IHME) team used an SEIR model to estimate trajectories of SARS-CoV-2 infections and the impact of non-pharmaceutical interventions at the state level from July 5 to December 31 2020. The model projects that cumulative total deaths across the US could reach 430,494 (288,046–649,582) by December 31st, 2020. Greater than 60% of the deaths projected in this scenario would occur in five states:

California, Florida, Texas, Massachusetts, and Virginia. The model indicates that an emphasis on universal mask use may reduce epidemic resurgences in many states, saving as many as 102,795 (95%CI 55,898 to 183,374) lives.

IHME COVID-19 Forecasting Team (July 14, 2020). COVID-19 Scenarios for the United States. Pre-print downloaded July 15 from https://doi.org/10.1101/2020.07.12.20151191

- *[Preprint, not peer-reviewed]* Andrasfay and Goldman used COVID-19 projections produced by the Institute for Health Metrics and Evaluation and estimated a reduction in life expectancy at birth due to COVID-19 of greater than 1.5 years for Black and Latino populations, which is one year larger than the reduction for whites. This would be a 30% increase (from 3.6 to 4.7 years) in the Black-white gap in life expectancy. The survival advantage among Latinos would decline by 36%, equivalent to its magnitude in 2006.

  Andrasfay and Goldman. (July 14, 2020). Impact of COVID-19 on 2020 US Life Expectancy for the Black and Latino Populations. Pre-print downloaded July 15 from https://doi.org/10.1101/2020.07.12.20148387

Public Health Policy and Practice

- *[Preprint, not peer-reviewed]* During March 1-April 30, 907 cases of SARS-CoV-2 infection were detected among detained persons (n = 628) and staff (n = 279) in the Cook County Jail (Chicago) and there were 9 deaths. Programmatic activity and visitation stopped on March 9, and cells were converted into single occupancy beginning March 26. Universal masking was implemented for staff (April 2) and detained persons (April 13). Cases at the jail declined while cases in Chicago increased.

  Zawitz et al. (July 14, 2020). Outbreak of COVID-19 and Interventions in One of the Largest Jails in the United States Cook County IL 2020. Pre-print downloaded July 15 from https://doi.org/10.1101/2020.07.12.20148494

Other Resources and Commentaries

- Researchers Home in on COVID-19 Severity Biomarkers – JAMA (July 14)
- COVID-19 Antibody Trials Have Begun – JAMA (July 14)
- Tackling the Cytokine Storm in COVID-19, Challenges, and Hopes – Life Sciences (July 11)
- Hypothetical Targets and Plausible Drugs of Coronavirus Infection Caused by SARS-CoV-2 – Transboundary and Emerging Diseases (July 13)
- The Spectrum of Pathological Findings in Coronavirus Disease (COVID-19) and the Pathogenesis of SARS-CoV-2 – Diagnostic Pathology (July 14)
- Universal Masking to Prevent SARS-CoV-2 Transmission—The Time Is Now – JAMA (July 14)
- Identification of Vulnerable Populations and Areas at Higher Risk of COVID-19 Related Mortality in the U.S. – Preprint (July 14)
- Unnecessary Hesitancy on Human Vaccine Tests – Science (July 10)
- Aligning Public Health Infrastructure and Medicaid to Fight COVID-19 – American Journal of Public Health (July 14)
- The Molecular Virology of Coronaviruses – The Journal of Biological Chemistry (July 13)
- The Covid-19 Vaccine-Development Multiverse – The New England Journal of Medicine (July 14)
- COVID-19 Contact Tracing Solutions for Mass Gatherings – Disaster Medicine and Public Health Preparedness (July 14)
- Covid-19: Disinfectants and Sanitisers Are Changing Microbiomes – BMJ (July 14)

- Subsequent Waves of Viral Pandemics a Hint for the Future Course of the SARS-CoV-2 Pandemic. – Preprint (July 14)
- State-Level Tracking of COVID-19 in the United States – Preprint (July 14)
- The Invisible Epidemic: Neglected Chronic Disease Management During COVID-19 – Journal of General Internal Medicine (July 14)

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 Incident Management Team