2019-nCoV Literature Situation Report (Lit Rep)

July 29, 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

- **School closures were associated in time with declines in COVID-19 incidence (-62%) and mortality (-58%) across US states, although at least some of the effect may have been due to other non-pharmaceutical interventions implemented concurrently.** More
- **Among 15,920 individuals presenting to Michigan Medicine for COVID-19 testing, 15% underwent multiple tests (average 2.6 tests per person). Among those who tested positive, hospitalization and ICU-level care were more common among those who tested multiple times.** More
- **An analysis of 85 patients with COVID-19 found that a minority had SARS-COV-2 RNA detected in serum, but that this finding was significantly associated with organ damage and in-hospital mortality.** More
- **The choice of which US reference population to use (CDC-weighted population versus the unweighted US Census population) results in considerable differences in the estimates of racial/ethnic disparities in COVID-19 deaths.** More

Non-Pharmaceutical Interventions

- Auger, et al. conducted a time series analysis for all 50 US states and found that school closures were temporally associated with declines in COVID-19 incidence (adjusted relative change per week, -62% [95% CI, -71% to -49%]) and mortality (adjusted relative change per week, -58% [95% CI, -68% to -46%]) during March 9-May 7, 2020. States in the lowest quartile of COVID-19 cumulative incidence at the time of school closure had the largest relative change in incidence (-72%, [95% CI, -79% to -62%]) versus states in the highest quartile (-49%, [95% CI, -62% to -33%]).
- The authors acknowledge that some of the observed declines may have been due to other non-pharmaceutical interventions implemented concurrently with school closures.

  Auger et al. (July 29, 2020). Association Between Statewide School Closure and COVID-19 Incidence and Mortality in the US. JAMA. https://doi.org/10.1001/jama.2020.14348

- Face mask-wearing and face-touching behaviors in the general population were analyzed using videos recorded in public areas in several countries before the COVID-19 pandemic (January 2018 to October 2019, n=4,699 individuals) and during the pandemic (February 2020 to March 2020, n=2,887 individuals). A significant increase in mask wearing was observed at locations in mainland China (from 1% to 99%), Japan (from 1% to 99%), South Korea (from 1% to 86%), and Western Europe (from 0.2% to 2%). Videos from the US showed a non-significant increase from 0.4% (1/269) to 2% (4/194) (p=0.17). Regression modeling showed that mask wearing was associated with a

reduction in face touching, which may prevent contact transmission of COVID-19 among the general population in public areas.

Chen et al. (July 29, 2020). Comparison of Face-Touching Behaviors Before and During the Coronavirus Disease 2019 Pandemic. JAMA Network Open. https://doi.org/10.1001/jamanetworkopen.2020.16924

- *[pre-print, not peer-reviewed]* During a 2-week period of business re-opening in mid-May following an extended statewide lockdown in Chittenden County, Vermont, observed face mask use at eight different business types was 76% overall, with higher mask use among females compared to males (84% vs. 68%). Older people (>60 years old) were most likely to wear a mask (91%) and children (≤14 years old) were the least likely (53%). This survey reported by Beckage et al. monitored the entrances to eight different business types from a distance and visually assessed a cohort of 1,004 individuals are recorded face mask use and estimated age and apparent gender.

  Beckage et al. (July 25, 2020). Prevalence of Mask Wearing in Northern Vermont in Response to SARS-CoV-2. Pre-print downloaded July 27 from https://doi.org/10.1101/2020.07.23.20158980

Testing and Treatment

- *[pre-print, not peer-reviewed]* Among 15,920 individuals presenting to Michigan Medicine for COVID-19 testing between March 10 and June 4, 2020, most (85%) only tested once and never tested positive (93%). A subset of 15% underwent multiple tests (average 2.6 tests per person). Non-Hispanic Black people were more likely to have additional testing than non-Hispanic white people (OR=1.21). Women were less likely than men to have additional testing (OR=0.86). Among 1,167 patients with at least one positive result, hospitalization (aOR=7.44) and ICU-level care (aOR=6.97) were significantly associated with repeated testing.

  Salerno et al. (July 29, 2020). Understanding the Patterns of Repeated Testing for COVID-19 Association with Patient Characteristics and Outcomes. Pre-print downloaded July 29 from https://doi.org/10.1101/2020.07.26.20162453

Vaccines

- Corbett et al. report that vaccination of Indian-origin rhesus macaques with mRNA-1273, a vaccine candidate encoding the prefusion-stabilized spike protein of SARS-CoV-2, induced robust antibody and T-cell responses before challenge with SARS-CoV-2 in upper- and lower-airway. Following exposure of the animals to infectious doses of SARS-CoV-2 there was indication of rapid protection from infection and no pathologic changes in the lungs of the animals.

  Corbett et al. (July 28, 2020). Evaluation of the MRNA-1273 Vaccine against SARS-CoV-2 in Nonhuman Primates. New England Journal of Medicine. https://doi.org/10.1056/NEJMoa2024671

Clinical Characteristics and Health Care Setting

- Co-infection with influenza A virus was found in 22% of a sample of patients in Iran who died and had SARS-CoV-2 infection confirmed by RT-PCR (n=1,444). The contribution of these co-infections to disease pathology is unclear from these results, but the authors note that such high rates of co-infection could make diagnostics more complicated.

  Hashemi et al. (July 28, 2020). High Prevalence of SARS-CoV-2 and Influenza A Virus (H1N1) Co-Infection in Dead Patients in Northeastern Iran. Journal of Medical Virology. https://doi.org/10.1002/jmv.26364

- *[pre-print, not peer-reviewed]* In an analysis using population-based data from Denmark (November 1, 2017 to June 30, 2020), among inpatients, those who tested positive for SARS-CoV-2 (n=1,657) had a 30-day mortality of 21% compared to 7% among those who tested positive for influenza (n=7,200). Among outpatients, the 30-day mortality was 2% among those positive for SARS-CoV-2 (n=6,263) and 0.4% among those positive for influenza (n=7,204).

  Nersesjan et al. (July 28, 2020). 30-Day Mortality and Morbidity in COVID-19 versus Influenza A Population-based Study. Pre-print downloaded July 29 from https://doi.org/10.1101/2020.07.25.20162156

- *[pre-print, not peer-reviewed]* Scalsky et al. examined the effect of cardiometabolic profiles on the risk of testing positive for SARS-CoV-2 among 9,005 UK Biobank participants. They found that elevated high density lipoprotein (HDL) was associated with reduced risk of testing positive for SARS-CoV-2 (aOR=0.85). Type II diabetes and HbA1c were associated with increased risk (OR=1.21 and 1.06), but the effects disappeared after controlling for HDL.

  Scalsky et al. (July 29, 2020). Baseline Cardiometabolic Profiles and SARS-CoV-2 Risk in the UK Biobank. Pre-print downloaded July 29 from https://doi.org/10.1101/2020.07.25.20161091

- *[pre-print, not peer-reviewed]* Wark et al. examined risk factors associated with ACE2 expression in 145 patients with asthma and chronic obstructive pulmonary disease (COPD) in Australia. They found that older age and male sex were associated with increased ACE2 expression, and asthma was associated with reduced expression. The authors concluded that altered ACE2 expression in the lower airway may be an important factor in SARS-CoV-2 virus tropism and may, in part, explain why patients with asthma do not appear to be overrepresented in those with COVID-19 complications.

  Wark et al. (July 29, 2020). ACE2 Expression Is Elevated in Airway Epithelial Cells from Aged and Male Donors but Reduced in Asthma. Pre-print downloaded July 29 from https://doi.org/10.1101/2020.07.26.20162248

- Among a cohort of 85 COVID-19 patients hospitalized with laboratory-confirmed COVID-19 in Wuhan, China, 32 had SARS-CoV-2 RNA detected in serum (RNAemia). Compared to patients without RNAemia, patients with RNAemia had a higher rate of organ damage (18/32 [56%] vs. 5/53 [9%], p<0.001), higher mortality (10/32 [31%] vs. 3/53 [6%], p=0.004), , and a variety of abnormal CT and laboratory biomarkers.

  Xu et al. (July 28, 2020). Relationship Between Serum SARS-CoV-2 Nucleic Acid (RNAemia) and Organ Damage in COVID-19 Patients: A Cohort Study. Clinical Infectious Diseases. https://doi.org/10.1093/cid/ciaa1085

Modeling and Prediction

- *[pre-print, not peer-reviewed]* Zhao et al. simulated epidemic projections of a potential COVID-19 outbreak in a university population of 38,000 persons. They estimated that the threshold number of contacts per person per day was 10 to prevent excess deaths in a scenario with a maximum capacity of trace and test of 50% and a 5.4% chance of transmission rate per contact per day. Further reducing the number of daily contacts to 4 or fewer allowed for up to a 6-day delay from the time of infection to diagnosis and isolation without loss of epidemic control.
- The authors suggest that these threshold estimates may help develop on-campus scheduling and indoor-spacing plans in conjunction with plans for asymptomatic testing for COVID-19.

Zhao et al. (July 25, 2020). Threshold Analyses on Rates of Testing Transmission and Contact for COVID-19 Control in a University Setting. Pre-print downloaded July 27 from https://doi.org/10.1101/2020.07.21.20158303

Public Health Policy and Practice

- Cowger et al. compared the percentage distribution of COVID-19 deaths in the US by race/ethnicity between the CDC's National Center for Health Statistics–weighted population and the unweighted US Census population and found that the weighting approach affects the relative mortality burden by race/ethnicity. In an analysis using the unweighted US Census data, Black individuals were the most overrepresented among COVID-19 deaths, accounting for an excess in absolute COVID-19 mortality of 10%, whereas white individuals were underrepresented (−8%). In contrast, an analysis with the CDC weighted data showed that white individuals were most overrepresented (11%) and Black individuals were less overrepresented (4%). The different approaches also yielded discrepancies among Latinx (−2% vs −10%) and Asian (0.1% vs −6%) individuals.
- The authors urged the CDC to publish data stratified by age, gender, education, and ZIP code characteristics instead of geographical distribution of racial groups to provide unbiased estimates of racial/ethnic disparities.

  Cowger et al. (July 28, 2020). Comparison of Weighted and Unweighted Population Data to Assess Inequities in Coronavirus Disease 2019 Deaths by Race/Ethnicity Reported by the US Centers for Disease Control and Prevention. JAMA Network Open. https://doi.org/10.1001/jamanetworkopen.2020.16933

- *[pre-print, not peer-reviewed]* Kontis et al. modeled the impacts of the first phase of the COVID-19 pandemic on all-cause mortality for 17 industrialized countries. From mid-February through the end of May 2020, an estimated 202,900 (95%CI 179,400-224,900) more people died in these 17 countries than were expected had the pandemic not occurred. After accounting for population size, England and Wales and Spain experienced the largest relative increase in deaths, with 37% (95%CI 30-44) in England and Wales and 38% (95%CI 31-44) in Spain).

  Kontis et al. (July 28, 2020). Magnitude Demographics and Dynamics of the Impact of the First Phase of the Covid-19 Pandemic on All-Cause Mortality in 17 Industrialised Countries. Pre-print downloaded July 29 from https://doi.org/10.1101/2020.07.26.20161570

Other Resources and Commentaries

- Reopening Primary Schools during the Pandemic – New England Journal of Medicine (July 29)
- The Challenges of Informative Wastewater Sampling for SARS-CoV-2 Must Be Met: Lessons from Polio Eradication – The Lancet Microbe (July 28)
- Telemedicine in Minority and Socioeconomically Disadvantaged Communities Amidst COVID-19 Pandemic – Otolaryngology (July 28)
- NIH Launches Platform to Serve as Depository for COVID-19 Medical Data – JAMA (July 28)
- Divide in Vaccine Belief in COVID-19 Conversations Implications for Immunization Plans – medRxiv (July 29)

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