2019-nCoV Literature Situation Report (Lit Rep)
April 14, 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

- **Multiple mathematical models use past data from Italy, China, and the US to evaluate the success of previously implemented public health approaches and make recommendations about future social distancing.**
- **Both case fatality rate and incidence of COVID-19 are significantly higher in US counties with lower socio-economic status and higher proportion of minority populations.**
- **C-reactive protein increased significantly at the initial stage of COVID-19, prior to CT findings, and may be a potential early predictor of severe disease.**
- **Findings from a model exploring the consequences of continuing standard operations in jails calls for large scale reductions in arrest and speeding of releases to save the lives of inmates and correction officers.**

Non-Pharmaceutical Interventions

- The authors determine that the community-based approach used in Veneto was associated with reduced cases, hospitalizations, deaths, and infection among HCWs when compared with the patient-centered approach used in Lombardy. Findings suggest that the impact of COVID-19 can be reduced through strong and aggressive public health efforts to confirm and isolate cases and to minimize unnecessary contact with HCWs.
- While the authors acknowledge that a community approach may be more challenging in the U.S. due to privatized health care, they propose Kaiser Permanente (KP) as a feasible setting, as KP serves a large population, integrates prevention and treatment, and has a tradition of community-based care.

  Binkin et al. (April 14, 2020). Protecting our health care workers while protecting our communities during the COVID-19 pandemic: a comparison of approaches and early outcomes in two Italian regions, Italy, 2020. Pre-print downloaded Apr 14 from https://doi.org/10.1101/2020.04.10.20060707

- The authors discuss the viability of deploying recovered individuals, who may have immunity to COVID-19, as part of emergency response, and the need to validate promising findings from using antibodies in convalescent plasma from recovered patients.

  Syal. (April 13, 2020). COVID-19: Herd Immunity and Convalescent Plasma Transfer Therapy. Journal. J Med Virol. https://doi.org/10.1002/jmv.25870

- Liu et al investigate the dynamics of social distancing on an age-stratified US population and the estimated burden on hospital bed availability. Findings suggest an optimal intermittent social-to-no-distancing ratio of 5:1, corresponding to an 80% reduction in healthcare demands.

  Liu et al. (April 14, 2020). Diminishing Marginal Benefit of Social Distancing in Balancing COVID-19 Medical Demand-to-Supply. Pre-print downloaded Apr 14 from https://doi.org/10.1101/2020.04.09.20059550

- The authors developed a minimal compartmental model to analyze policies on mobility restrictions in Italy, treating Italian regions as separate entities in which social interactions through differing age classes occur. They found that premature lockdowns barely shift the epidemic in time and that quelled epidemics can quickly recur post-lockdown.
- They suggest that young and elderly people are the most interconnected, and relaxing lockdown measures to only the middle age class (20-69) can be enough to lesson contagion in the post-lockdown phase.

  Scala et al. (April 9, 2020). Between Geography and Demography: Key Interdependencies and Exit Mechanisms for Covid-19. Pre-print downloaded Apr 14 from https://doi.org/10.1101/2020.04.09.20059592

Transmission

- The CDC presents data on 121 heath care personnel (HCP) exposed to the first confirmed case of community-acquired COVID-19, of whom 43 developed symptoms during the 14 days after exposure and 3 had positive test results.
- Unprotected, prolonged patient contact, as well as certain exposures, including some aerosol-generating procedures, were associated with SARS-CoV-2 infection in HCP. Early recognition and isolation of patients with possible infection and use of recommended PPE can help minimize exposures and protect the health care workforce.

  Heinzerling et al. (April 14, 2020). Transmission of COVID-19 to Health Care Personnel During Exposures to a Hospitalized Patient — Solano County, California, February 2020. MMWR. https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6915e5-H.pdf

- This 1:4 paired case-control study of COVID-19 patients with nosocomial infections (NI) (n=65) and patients without NI (n=260) explored influencing factors of infection. The authors determined that NI are common among patients with COVID-19, and that special attention should be paid to diabetic patients and patients with invasive devices.

  He et al. (April 13, 2020). Nosocomial infection among patients with coronavirus disease-2019: a retrospective data analysis of 918 cases from a single center in Wuhan city, China. Inf Control Hosp Epidemiol. https://doi.org/10.1017/ice.2020.126

- Wu et al present SARS-CoV-2 RT PCR results from respiratory and fecal samples taken from 98 COVID-19 patients at a Chinese hospital, throughout the course of their illness and quarantine period. Their data suggest the possibility of extended duration of viral shedding in feces for nearly 5 weeks after respiratory samples tested negative, which may have implications for patient discharge and quarantine.

  Wu et al. (March 19, 2020). Prolonged presence of SARS-CoV-2 viral RNA in faecal samples. Lancet. https://doi.org/10.1016/S2468-1253(20)30083-2

Testing and Treatment

- All adults in 4 French hospitals (n=181) with documented SARS-CoV-2 pneumonia were used to emulate a target trial assessing the effectiveness of hydroxychloroquine (HCQ) at 600 mg/day. Findings do not support use of HQC, with no observed reduction in disease severity or death.

Mahevas et al. (April 14, 2020). No evidence of clinical efficacy of hydroxychloroquine in patients hospitalised for COVID-19 infection and requiring oxygen: results of a study using routinely collected data to emulate a target trial. Pre-print downloaded Apr 14 from https://doi.org/10.1101/2020.04.10.20060699

- Two New York City birthing hospitals share results from universal COVID-19 screening of all pregnant women admitted for delivery (n=215). Over 15% of all women admitted screened positive, with most positive patients presenting as asymptomatic.

  Sutton et al. (April 13, 2020). Universal Screening for SARS-CoV-2 in Women Admitted for Delivery. NEJM. https://doi.org/10.1056/NEJMc2009316

Clinical Characteristics and Health Care Setting

- This study found that each percentile increase in county-level social vulnerability to disasters, measured using the Social Vulnerability Index, was associated with a 63% higher case fatality rate (CFR) after adjusting for other factors. Both CFR and incidence of COVID-19 were significantly higher in counties with lower socio-economic status and higher proportion of minority populations.

  Nayak et al. (April 14, 2020). Impact of Social Vulnerability on COVID-19 Incidence and Outcomes in the United States. Pre-print downloaded Apr 14 from https://doi.org/10.1101/2020.04.10.20060962

- The CDC presents characteristics from 9,282 cases of COVID-19 reported among US HCP. Most HCP were not hospitalized, however severe outcomes, including death, were reported among all age groups.

  Burrer et al. (April 14, 2020). Characteristics of Health Care Personnel with COVID-19 — United States, February 12–April 9, 2020. MMWR. https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6915e6-H.pdf

- Clinical parameters from 27 consecutive COVID-19 patients and 75 flu patients at initial, progression, peak, and recovery stages of illness were analyzed. The authors found that C-reactive protein in severe COVID-19 patients increased significantly at the initial stage, prior to CT findings, and suggest that this could be used as an early predictor of severe disease.

  Tan et al. (April 13, 2020). C-reactive protein correlates with CT findings and predicts severe COVID-19 early. J Med Virol. https://doi.org/10.1002/jmv.25871

Mental Health and Personal Impact

- A cross-sectional survey of 1,310 Spanish people evaluated stress and loneliness against demographic factors, such as age and sex. The authors found that negative self-perceptions of aging and lower age, together with family and personal resources, are associated with loneliness and psychological distress, but that older adults with positive self-perceptions of aging seem to be more resilient.

  Losada et al. (April 13, 2020). "We're staying at home". Association of self-perceptions of aging, personal and family resources and loneliness with psychological distress during the lock-down period of COVID-19. J Gerontol B Psychol Sci Soc Sci. https://doi.org/10.1093/geronb/gbaa048

Modelling and Prediction

- A global network model was integrated with a local epidemic SEIR model to quantify outbreak dynamics in China and the US. Adopting the latent and infectious periods observed in China (2.5 days and 17.8 days, respectively), the authors predict a nationwide peak of outbreak in the US on May 10, 2020 with 3 million infections.

Peirlinck et al. (April 11, 2020). Outbreak dynamics of COVID-19 in China and the United States. Pre-print downloaded Apr 14 from https://doi.org/10.1101/2020.04.06.20055863

- Harbert et al used species distribution modeling with US county-level data to evaluate the impact of climate on transmission. While finding slightly more cases in cooler areas, the authors conclude that climate may not play a central role in US viral distribution.

  Harbert et al. (April 10, 2020). Spatial modeling cannot currently differentiate SARS-CoV-2 coronavirus and human distributions on the basis of climate in the United States. Pre-print downloaded Apr 14 from https://doi.org/10.1101/2020.04.08.20057281

Public Health Policy and Practice

- The authors present a mathematical model exploring the epidemiological consequences of maintaining standard jail operations during the COVID-19 pandemic in contrast with proposed interventions.
- They conclude that operating in a business as usual way will result in significant and rapid loss of life, both among inmates and correction officers, and recommend large scale reductions in arrest and speeding of releases in order to save lives.

  Lofgren et al. (April 14, 2020). The Epidemiological Implications of Incarceration Dynamics in Jails for Community, Corrections Officer, and Incarcerated Population Risks from COVID-19. Pre-print downloaded Apr 14 from https://doi.org/10.1101/2020.04.08.20058842

- Baluja et al propose a method to decontaminate several facepiece filtering respirators at once using ultraviolet-C radiation in closed box settings.

  Baluja et al. (April 11, 2020). UV light dosage distribution over irregular respirator surfaces. Methods and implications for safety. Pre-print downloaded Apr 14 from https://doi.org/10.1101/2020.04.07.20057224

- The authors present their validation of a method of heating N95 respirators with moisture, finding no degradation of mask filtration efficiency. The heating method is scalable to over a thousand per day using a single industrial convection oven, making this potentially practical for local application.

  Anderegg et al. (April 9, 2020). A Scalable Method of Applying Heat and Humidity for Decontamination of N95 Respirators During the COVID-19 Crisis. Downloaded Apr 14 from https://doi.org/10.1101/2020.04.09.20059758

Other Resources and Commentaries

- Three lessons for the COVID-19 response from pandemic HIV – Lancet HIV (Apr 13)
- Mental Health and the Covid-19 Pandemic – NEJM (Apr 13)