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.
  

- 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.
  
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.


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.


Transmission

The CDC presents data on 121 health 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.


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.


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.


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.

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.

- 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.

- 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.

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.

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.

Updated 4/14/2020
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.


- 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.


Other Resources and Commentaries

- Mental Health and the Covid-19 Pandemic – NEJM (Apr 13)