2019-nCoV Literature Situation Report (Lit Rep)
May 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

➢ **Models show that even the most efficient contact tracing strategies are not sufficient to bringing the effective reproduction number (R) to below 1 if there are testing delays as short as 4 days. App-based contact tracing, even with coverage as low as 20%, may be superior to conventional contact tracing.**

➢ **Combining government-imposed social distancing measures could reduce the daily growth rate by 9.1% after 16-20 since implementation.**

➢ **In a community-based study, saliva-based testing was found to be 15% less sensitive than nasopharyngeal swabs**

➢ **Authors in the UK have developed and applied a real-time genomic surveillance approach to detect hospital clusters of COVID-19 that can inform infection control practices**

➢ **From March 11-May 2, 2020, there was an estimated excess of 24,172 deaths in New York City, above what would be expected based on past years and seasonal trends. Of these, 18,879 (78%) were confirmed or probable COVID-19 associated, leaving 5,923 (22%) deaths that might have been directly or indirectly attributable to the pandemic.**

Non-Pharmaceutical Interventions

• Researchers evaluated the impact of four government-imposed social distancing measures, including public school closures, bans on large social gatherings, closures of entertainment-related businesses, and shelter-in-place orders (SIPOs) on the spread of COVID-19 across US counties. They found that their combined adoption reduced the daily growth rate by 9.1% after 16-20 days of implementation.

• When considered separately, each measure was associated with a reduction in the daily growth rate, but school closures and social gathering bans did not have a significant effect, suggesting that these policies may displace rather than reduce social interactions.

Courtemanche et al. (May 14, 2020). Strong Social Distancing Measures In The United States Reduced The COVID-19 Growth Rate. Health Affairs. https://doi.org/10.1377/hlthaff.2020.00608

Transmission

• A systematic review that included 5 articles from three countries (China, USA, and Italy) reports a pooled estimate of the proportion of asymptomatic cases to be 16% (95% CI: 12%-20%). While the findings are lower than many highly publicized studies, the sampling frame for the US-based studies

only included residents, healthcare personnel, and visitors of long-term care facilities and may not be a reflection of the true role of asymptomatic cases in the US.

> *Byambasuren et al. (May 15, 2020). Estimating the Extent of True Asymptomatic COVID-19 and Its Potential for Community Transmission Systematic Review and Meta-Analysis. Preprint downloaded May 15 from* https://doi.org/10.1101/2020.05.10.20097543

Testing and Treatment

- Saliva-based testing, compared to nasopharyngeal swabs (NPS), was found to be 15% less sensitive in a community-based diagnostic setting (N=88) and 50% less sensitive in a convalescent cohort (>8 and <21 days from first symptoms; N=24).
- In the community-based diagnostic setting, saliva samples were randomized to two collection tube types (OM-505 and OGD-610) with different proprietary nucleic acid stabilization solutions, and testing was completed at Helix, a high-complexity CLIA laboratory. NPS samples were tested using the CDC COVID-19 assay at the Nevada State Public Health Laboratory.
- In the convalescent cohort, previously-diagnosed patients were recalled for paired NPS and saliva collection, using the OG-610 kit; both tests were conducted at Helix.

> *Becker et al. (May 15, 2020). Saliva Is Less Sensitive than Nasopharyngeal Swabs for COVID-19 Detection in the Community Setting. Pre-print downloaded May 15 from* https://doi.org/10.1101/2020.05.11.20092338

- Using a sequencing method with a sample-to-sequence delay of less than 24 hours, paired with a reporting system that integrates these genomic data with epidemiological data, Meredith et al. identified both hospital and community clusters among patients from a UK hospital. In addition to detecting cryptic transmission events, this real-time genomic surveillance approach was used to inform infection control and patient safety practices.

> *Meredith et al. (May 15, 2020). Rapid Implementation of Real-Time SARS-CoV-2 Sequencing to Investigate Healthcare-Associated COVID-19 Infections. Pre-print downloaded May 15 from* https://doi.org/10.1101/2020.05.08.20095687

Clinical Characteristics and Health Care Setting

- Using data on all 336 cases of COVID-19 in Shanghai, China through March 12, as well as 220 clinical and laboratory records, Sun et al. built a risk prediction model for discriminating severe/critical illness. Thirty-six clinical indicators were found to be significantly associated with severe/critical symptoms. The AUC for the final model (Support Vector Machine) for discriminating severe/critical cases from mild cases was 0.98 in the test set.

> *Sun et al. (May 13, 2020). Combination of Four Clinical Indicators Predicts the Severe/Critical Symptom of Patients Infected COVID-19. Journal of Clinical Virology.* https://doi.org/10.1016/j.jcv.2020.104431

- This retrospective cohort study found a considerable difference in albumin levels between survivors and non-survivors of COVID-19. Results also showed that hypoalbuminemia was a predictive factor for mortality (OR = 6.4, 95%CI: 1.3, 31.1).

> *Huang et al. (May 14, 2020). Hypoalbuminemia Predicts the Outcome of COVID-19 Independent of Age and Co-morbidity. Journal of Medical Virology.* https://doi.org/10.1002/jmv.26003

- Though previous studies have shown that children are at lower risk of developing severe illness compared to adults, the incidence of critical illness among children with COVID-19 is still not well

known. Chao et al. observed 46 COVID-19 positive children (median age = 13.1) hospitalized in New York, and report that 28% were admitted to the pediatric intensive care unit (PICU), which is a higher proportion of severe disease requiring PICU admission than previously recognized.

Chao et al. (May 6, 2020). Clinical Characteristics and Outcomes of Hospitalized and Critically Ill Children and Adolescents with Coronavirus Disease 2019 (COVID-19) at a Tertiary Care Medical Center in New York City. The Journal of Pediatrics. https://doi.org/10.1016/j.jpeds.2020.05.006

Modeling and Prediction

- Researchers modeled the impact of delays in contact tracing strategies (CTS) and found that testing delay (time between onset of symptoms to testing and diagnosis) could seriously attenuate any contact tracing efforts. A testing delay of 3 days would require contacts to be traced within 1 day and with 80% coverage to keep the effective reproduction number (R) below 1. A testing delay of 4 days would prevent the R from going below 1 even with the most efficient CTS (0 tracing delay, 100% coverage).
- The findings also highlight the effectiveness of app-based contact tracing and estimates indicate that even with only 20% coverage, it is superior to conventional contact tracing.
- This model assumes a baseline R of 1.2, no transmission in healthcare settings, and that all index cases and contacts no longer transmit the virus.

Kretzschmar et al. (May 15, 2020). Time Is of the Essence Impact of Delays on Effectiveness of Contact Tracing for COVID-19. Preprint downloaded May 15 from https://doi.org/10.1101/2020.05.09.20096289

Public Health Policy and Practice

- Applying a seasonal periodic model (as used for monitoring seasonal influenza) to estimate expected deaths, Olson et al. found that 24,172 out of 32,107 (75%) deaths in New York City from March 11-May 2, 2020 were in excess of what would have been expected. Of these 24,172 deaths, 13,831 (57%) were laboratory-confirmed COVID-19-associated and 5,048 (21%) were probable COVID-associated. The remaining 5,923 (22%) excess deaths may be directly or indirectly attributed to the COVID-19 pandemic.

Olson et al. (May 15, 2020). Preliminary Estimate of Excess Mortality During the COVID-19 Outbreak - New York City, March 11-May 2, 2020. MMWR. https://doi.org/10.15585/mmwr.mm6919e5

- During April 22–28, 2020, aggregate data on COVID-19 cases were reported to CDC by 37 of 54 state and territorial health department jurisdictions. Among these, 86% reported at least one laboratory confirmed case from a total of 420 correctional and detention facilities.
- There were 4,983 infections and 88 deaths among incarcerated or detained persons, and 2,778 infections and 15 deaths among facility staff members.

Wallace et al. (May 15, 2020). COVID-19 in Correctional and Detention Facilities - United States, February-April 2020. MMWR. https://doi.org/10.15585/mmwr.mm6919e1

Other Resources and Commentaries

- A wake-up call: COVID-19 and its impact on children's health and wellbeing – Lancet Global Health (May 12)
- Whose coronavirus strategy worked best? Scientists hunt most effective policies – Nature (April 27)
- Clinical course of 2019 novel coronavirus disease (COVID-19) in individuals present during the outbreak on the Diamond Princess cruise ship – Journal of Infection and Chemotherapy (May 7)

- [COVID-19 in the long-term care setting: the CMS perspective](#) – Journal of the American Geriatrics Society (May 13)
- [Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration — United States, 2020](#) – MMWR (May 15)
- [Pathogenesis and transmission of SARS-CoV-2 in golden hamsters](#) – Nature (May 14)
- [Infection of dogs with SARS-CoV-2](#) – Nature (May 14)
- [Why Aren't People Living with HIV at Higher Risk for Developing Severe COVID-19?](#) – AIDS Patient Care and STDs (May 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 Incidence Management Team

Updated 5/15/2020