2019-nCoV Literature Situation Report (Lit Rep)
April 13, 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

- **Though not considered an aerosol generating procedure, persons giving birth exert extreme effort and frequently blow outwards, cough, shout, and vomit, all of which put the health care team at risk of exposure to COVID-19.**
- **Continued viral shedding in feces 7 days after negative conversion in pharyngeal swabs suggests the possibility of further SARS-CoV-2 transmission via the fecal-oral route in recovered patients.**
- **Long-term use of glucocorticoids might cause atypical infections, a longer incubation period (up to 40 days) and increased transmission of COVID-19.**
- **Mutations in the helicase and orf1a coding regions of SARS-CoV-2 occur regularly. Primer sets for diagnosis need to be carefully designed, since rapidly occurring variants would affect the performance of the RT-qPCR based viral testing.**

Non-Pharmaceutical Interventions

- Although the second stage of labor has previously not been considered an aerosol generating procedure (AGP), persons in labor exert extreme effort during the process and frequently blow out their breath, cough, shout, and vomit, all of which put the health care team at risk of COVID-19. Palatnik and McIntosh recommend that labor and delivery personnel exhibit the utmost caution and be provided with full PPE including N95 during this stage of labor. It is critical to ensure the adequate protection for health care workers and to prevent spread to other health care workers and patients.

  Palatnik and McIntosh. (April 10, 2020). Protecting Labor and Delivery Personnel from COVID-19 during the Second Stage of Labor. Am J Perinatol. https://doi.org/10.1055/s-0040-1709689

Transmission

- Chen et al reported on fecal shedding of SARS-CoV-2 in COVID-19 patients, including those without gastrointestinal symptoms, and the severity of illness. They reported 7 (6-10) days as duration of viral shedding from feces after negative conversion in pharyngeal swabs, and suggested the possibility of SARS-CoV-2 transmission via the fecal-oral route.

  Chen et al. (April 3, 2020). The Presence of SARS-CoV-2 RNA in Feces of COVID-19 Patients. Journal of Medical Virology. https://doi.org/10.1002/jmv.25825

- Han et al report a familial cluster of COVID-19 where a 47-year-old woman with long-term use of glucocorticoids did not develop any symptoms within the 14- day quarantine period but was confirmed with COVID-19 on day 40 after she left Wuhan. The results suggest that the long-term use of glucocorticoids might cause atypical infections, a long incubation period, and extra transmission of COVID-19.

  Han et al. (May 2020). COVID-19 in a patient with long-term use of glucocorticoids: A study of a familial cluster. Clinical Immunology. https://doi.org/10.1016/j.clim.2020.108413

Testing and Treatment

- Farkas et al described early mutational events across samples from publicly available SARS-CoV-2 sequences from the archive repository. Five-point mutations with clonal (founder) effect were found in USA sequencing samples, but the Australian mutation signatures were more diverse than USA samples. Mutations in the helicase and orf1a coding regions were predominant, suggesting that these proteins are prone to evolve by natural selection. They firmly urge primer sets for diagnosis be carefully designed, since rapidly occurring variants would affect the performance of the RT-qPCR based viral testing.

  Farkas et al. (April 12, 2020). Insights on early mutational events in SARS-CoV-2 virus reveal founder effects across geographical regions. Pre-print downloaded Apr 13 from https://doi.org/10.1101/2020.04.09.034462.

- The Innovative Genomics Institute SARS-CoV-2 Testing Consortium describe the strategy they used to establish a CLIA-licensed clinical laboratory to perform a validated Laboratory-Developed Test (LDT) for SARS-CoV-2 in Berkeley, California and the surrounding Bay Area community. The procedures for implementing the technical, regulatory, and data management work streams necessary for clinical sample processing provide a roadmap to aid others in setting up similar testing centers.

  Innovative Genomics Institute SARS-CoV-2 Testing Consortium. (April 12 2020). Blueprint for a Pop-up SARS-CoV-2 Testing Lab. Pre-print downloaded Apr 13 from https://doi.org/10.1101/2020.04.11.20061424

- Zang et al characterized the chest CT findings of SARS-CoV-2 according to clinical severity in hospital setting in Wuhan City. In their report, they present a summary of clinical features and predominant patterns of abnormalities observed on CT for asymptomatic, typic common, and severe cases. These findings may help clinicians to identify severe patients quickly at admission for better treatment outcomes.

  Zang et al. (April 11 2020). CT features of SARS-CoV-2 pneumonia according to clinical presentation: a retrospective analysis of 120 consecutive patients from Wuhan city. European Radiology. https://doi.org/10.1007/s00330-020-06854-1

- The SARS-Cov2 virus binds to the ACE2 receptor for cell entry. Bean et al reported that treatment with ACE-inhibitors was associated with a reduced risk of rapidly deteriorating severe disease.

  Bean et al. (April 11 2020). Treatment with ACE-inhibitors is associated with less severe disease with SARS-Covid-19 infection in a multi-site UK acute Hospital Trust. Pre-print downloaded Apr 13 from https://doi.org/10.1101/2020.04.07.20056788

- Han et al conducted a cross-sectional study to investigate loss of smell and taste as pathognomonic symptom of COVID-19 using an internet-based platform on adult subjects who underwent testing for Covid-19. Smell and taste loss were reported in 68% and 71% of Covid-19-positive subjects, respectively, compared to 16% and 17% of Covid-19-negative patients. Smell and taste impairment

were independently and strongly associated with Covid-19-positivity, whereas sore throat was not. They concluded that loss of taste and smell could be an early indicator of COVID-19.

Han et al. (April 2020). Association of chemosensory dysfunction and Covid-19 in patients presenting with influenza-like symptoms. Int Forum Allergy Rhinol. https://www.ncbi.nlm.nih.gov/pubmed/32279441

Clinical Characteristics and Health Care Setting

- Petrilli et al examined factors associated with hospitalization and critical illness in Covid-19 positive patients treated at a health system in New York City between March 1 - April 2, 2020. The strongest risk factors for hospitalization identified were: age >65 yrs, BMI>40 and heart failure. Strongest critical illness risks were: admission oxygen saturation <88%, d-dimer>2500, ferritin >2500 and C-reactive protein >200. They concluded that age and comorbidities were powerful predictors of hospitalization; however, admission oxygen impairment and markers of inflammation were most strongly associated with critical illness.

  Petrilli et al. (April 11 2020). Factors associated with hospitalization and critical illness among 4,103 patients with Covid-19 disease in New York City. Pre-print downloaded Apr 13 from https://doi.org/10.1101/2020.04.08.20057794

- Hussain et al reviewed scientific literature for general characteristics of the SARS-CoV-2 to provide a better understanding and management of COVID-19 in diabetic patients. They identified chronic inflammation, increased coagulation activity, immune response impairment, and potential direct pancreatic damage by SARS-CoV-2 as underlying mechanisms. They caution against using chloroquine during hypoglycemic events in patients. From these limited evidence, no definite conclusions were made. Further research is warranted.

  Hussain et al. (April 6 2020). COVID-19 and Diabetes: Knowledge in Progress. Pre-print downloaded April 13 from https://doi.org/10.1016/j.diabres.2020.108142

Mental Health and Personal Impact

- Yifan et al investigated the symptoms and causes of Somatic Symptom Disorders of 140 ICU nurses treating COVID-19 patients. They reported 5 major symptoms: chest-discomfort-and-palpitation, dyspnea, nausea, headache, and dizziness. Symptoms were classified into 3 clusters: Cluster A, breathing and sleep disturbances; Cluster B, gastrointestinal complaints and pain; and Cluster C, general symptoms. Results provide evidence for the establishment of better management and interventions to safeguard the health of ICU nurses

  Yifan etal. (Mar 30 2020). Symptom Cluster of ICU nurses treating COVID-19 pneumonia patients in Wuhan, China. Pre-print downloaded Apr 13 from https://doi.org/10.1016/j.jpainsymman.2020.03.039

Modelling and Prediction

- A new technique, the method for active pandemic curve management (MAPCM), uses a quasi-open-loop control method to shape the outbreak curve of SARS-CoV-2 spread in a population. This method may make it possible to keep hospitalizations within available healthcare capacity without sacrificing lives while keeping the economy moving. He reports that better results can be achieved using this method than imposing mitigation by itself, and concludes that this method is promising if implemented early enough in outbreak cycle.

  Odendaal. (April 6 2020). Method for Active Pandemic Curve Management (MAPCM). Pre-print downloaded Apr 13, from https://doi.org/10.1101/2020.04.06.20055699.

Other Resources and Commentaries

- Which Melbourne metropolitan areas are vulnerable to COVID-19 based 1 on age, disability and 2 access to health services? Using spatial analysis to identify service gaps and inform delivery - Journal of Pain and Symptom Management (April 2020)
- Is the spread of COVID-19 across countries influenced by environmental, economic and social factors? – BMJ (April 2020)
- The Mental Health Consequences of COVID-19 and Physical Distancing The Need for Prevention and Early Intervention – JAMA Internal Medicine (April 2020)
- Timing of Community Mitigation and Changes in Reported COVID-19 and Community Mobility — Four U.S. Metropolitan Areas, February 26–April 1, 2020 – CDC-MMWR (April 2020)