2019-nCoV Literature Situation Report (Lit Rep)

January 19, 2021

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

- ➢ **The sensitivity of the BinaxNOW antigen test to detect people infected with SARS-CoV-2, compared with RT-PCR, was 35.8% among asymptomatic persons and 64.2% among and symptomatic persons. Specificity was near 100% in both groups. Sensitivity was higher among specimens positive for viral culture.** More
- ➢ **A large retrospective study of COVID-19 contact tracing in Wuhan, China (through April 18, 2020) estimated an overall attack rate within households of 15%. Older individuals were the most susceptible to infection, but were the least likely to transmit to others if infected. Asymptomatic individuals were 80% less likely to infect others compared to symptomatic cases. Pre-symptomatic individuals were 1.4-times as likely to infect others compared to after symptom onset.** More
- ➢ **While antibody titers and neutralizing activity decline over time following SARS-CoV-2 infection, levels of SARS-CoV-2 specific memory B cells remain unchanged up to 6 months. Over time, memory B cells produce antibodies with increased potency and resistance to viral mutations.** More
- ➢ **The authors of an analysis of nationwide weekly SARS-CoV-2 incidence in Israel conclude that easing social gathering restrictions, rather than school reopening, was the major contributor to transmission.** More

Non-Pharmaceutical Interventions

- Nationwide weekly incidence of SARS-CoV-2 infections in Israel gradually increased after school reopening in May 2020, and positivity rates 21-27 days following school reopening increased at least 3-fold among adults ≥20 years, but did not increase for children <20 years old. No increase was observed in COVID-19 associated hospitalizations and deaths following school reopening. However, following the easing of social gathering restrictions from May to June 2020 (which coincided with the end of the academic school year), a significant increase in hospitalizations and mortality was observed. The authors suggest that easing social gathering restrictions, rather than school reopening, was the major contributor to transmission.

  Somekh et al. (Jan 18, 2021). Reopening Schools and the Dynamics of SARS-CoV-2 Infections in Israel: A Nationwide Study. Clinical Infectious Diseases. https://doi.org/10.1093/cid/ciab035

Transmission

- A retrospective cohort study using contact tracing records from more than 27,000 households in Wuhan, China through April 18 estimated an overall SARS-CoV-2 attack rate among people living in the same household of 16%, assuming a mean incubation period of 5 days and a maximum

infectious period of 22 days. Individuals ≥60 years old were more susceptible to infection than all other age groups, but were less infectious than children and adolescents ≤20 years. Asymptomatic cases were 80% less likely to infect others compared to symptomatic cases. Symptomatic cases were 1.4-times as likely to infect others while they were presymptomatic, compared to after symptom onset. Mass isolation of cases and quarantine of household contacts, along with lockdown policies, was judged to have caused a 52% decline in the household reproductive number among primary cases and a 63% decline among secondary cases.

Li et al. (Jan 18, 2021). Household Transmission of SARS-CoV-2 and Risk Factors for Susceptibility and Infectivity in Wuhan: A Retrospective Observational Study. The Lancet Infectious Diseases. https://doi.org/10.1016/S1473-3099(20)30981-6

- A retrospective study of the April 2020 outbreak at the Marion Correctional Institution in Ohio showed rapid, widespread infection, with nearly 80% of inmates infected within three weeks of the first reported case. The authors suggest three scenarios that could have given rise to the outbreak: 1) a single initially infected inmate with a basic reproduction number, R_0, greater than 14; 2) a super-spreading event with an $R_0 = 3$; or 3) undetected virus circulation among inmates prior to April.

  KhudaBukhsh et al. (Jan 15, 2021). COVID-19 Dynamics in an Ohio Prison. Pre-print downloaded Jan 19 from https://doi.org/10.1101/2021.01.14.21249782

- A cross-sectional study in Western India estimated a SARS-CoV-2 household attack rate from pediatric index cases of 2%, based on 72 pediatric index COVID-19 cases and 287 household contacts. Index cases were mostly male (94%) and between the ages of 12-18 (74%). Households of index cases with secondary infections were larger than those without secondary transmission (6.75 vs 4.9 members).

  Shah et al. (Jan 18, 2021). Secondary Attack Rate in Household Contacts of COVID-19 Paediatric Index Cases: A Study from Western India. Journal of Public Health. https://doi.org/10.1093/pubmed/fdaa269

Testing and Treatment

- The sensitivity of the BinaxNOW antigen test, compared to RT-PCR, was lower when testing specimens from asymptomatic (35.8%) than from symptomatic (64.2%) persons, based on 3,419 paired specimens from community testing in Arizona. Specificity was near 100% for both groups. Sensitivity was higher among the 96 specimens positive for viral culture (92.6% and 78.6% for those from symptomatic and asymptomatic persons, respectively). However, 11 out of 96 specimens positive for viral culture were antigen-test negative. Despite low sensitivity, the authors suggest that antigen testing could be particularly useful in high prevalence settings.

  Prince-Guerra et al. (Jan 19, 2021). Evaluation of Abbott BinaxNOW Rapid Antigen Test for SARS-CoV-2 Infection at Two Community-Based Testing Sites — Pima County, Arizona, November 3–17, 2020. MMWR. https://doi.org/10.15585/mmwr.mm7003e3

Vaccines and Immunity

- National US survey data (n=45,000) show disparities in beliefs about the safety and efficacy of the H1N1 influenza vaccine across sex and race, which the authors suggest could be relevant for the uptake of COVID-19 vaccines. While H1N1 vaccine uptake was low across groups, Black respondents were more likely than white respondents to express safety and efficacy concerns about the vaccine. Disparities in beliefs were consistent with vaccination rates, with vaccination rates highest among white females (28%), followed by white males (26%), Black males (22%), and Black females (18%). In particular, Black women experienced 35–45% lower odds of vaccination than white women. The

authors caution that like the H1N1 vaccine, uptake of the COVID-19 vaccine could be lower among Black Americans.

Burger et al. (Jan 11, 2021). Black-White Disparities in 2009 H1N1 Vaccination among Adults in the United States: A Cautionary Tale for the COVID-19 Pandemic. Vaccine. https://doi.org/10.1016/j.vaccine.2020.12.069

- Serological analysis in a cohort of 87 SARS-CoV-2 recovered individuals show that between 1.3 and 6.2 months after infection, IgM and IgG anti-spike receptor binding domain (RBD) antibody titers decrease, and neutralizing activity declines by 5-fold. In contrast, levels of RBD-specific memory B cells remain largely unchanged. Antibodies expressed by the memory B cells at 6.2 months have greater somatic hypermutation, increased potency and resistance to RBD mutations, which is indicative of an evolving immune response to SARS-CoV-2.

  Gaebler et al. (Jan 18, 2021). Evolution of Antibody Immunity to SARS-CoV-2. Nature. https://doi.org/10.1038/s41586-021-03207-w

Modeling and Prediction

- A SARS-CoV-2 transmission model parametrized to the University of California San Diego showed that reducing on-campus housing occupancy to single residents and implementing a hybrid instruction format (only 12% of sections in-person) with a class size cap of 50 could substantially reduce the basic reproduction number, R_0. However, the addition of masking and physical distancing were required to reduce R_0 to at or below 1. While the model also showed that increasing asymptomatic testing frequency from monthly to twice weekly had minimal impact on the average outbreak size, it could substantially reduce the maximum outbreak size and cumulative number of cases.

  Goyal et al. (Jan 19, 2021). Evaluation of SARS-CoV-2 Transmission Mitigation Strategies on a University Campus Using an Agent-Based Network Model. Clinical Infectious Diseases. https://doi.org/10.1093/cid/ciab037

- Vaccine allocation models parametrized to the seroprevalence estimates of Rhode Island and Massachusetts show that allocating >75% of the vaccine supply to individuals ≥70 years old optimally reduces total cumulative deaths through mid-2021. Although not explicitly modelled, allocating a majority of the supply to other high-risk groups will yield the same effect. Vaccinating seronegative individuals only avoids redundancy and could result in 1-2% reductions in cumulative hospitalizations.

  Tran et al. (Jan 15, 2021). Optimal SARS-CoV-2 Vaccine Allocation Using Real-Time Seroprevalence Estimates in Rhode Island and Massachusetts. Pre-print downloaded Jan 19 from https://doi.org/10.1101/2021.01.12.21249694

Public Health Policy and Practice

- Among 566 Italian residents, 90% reported that they considered a swab test for SARS-CoV-2 to be useful, but only 67% understood the impact of test diagnostic accuracy and infection prevalence on test predictive value. Participants underestimated the specificity and overestimated the sensitivity of the test. They also tended to overestimate the positive predictive value and underestimate the negative predictive value. Positive results were evaluated by participants as more informative than negative results, and a short-term repeat test was considered more useful after a positive result than a negative result. Human error and technical characteristics were more likely to be cited to cause false positives, while level of viral load was more likely cited as the cause of false negatives.

Pighin and Tentori. (Jan 17, 2021). Public's Understanding of Swab Test Results for SARS-CoV-2: An Online Behavioural Experiment during the April 2020 Lockdown. BMJ Open. https://doi.org/10.1136/bmjopen-2020-043925

- A majority of COVID-19-related documents produced by the WHO, UK, US and Australian governments were shown to be at or above recommended readability levels. Though the study suggests that the included US documents (n=10) are easiest to read among all the documents, the mean Flesch Reading Ease Score of US documents was a 53.1, which corresponds to a "difficult" readability rating by the US Department of Health and Human Services.

  Ferguson et al. (Jan 18, 2021). Communications in the Time of a Pandemic: The Readability of Documents for Public Consumption. Australian and New Zealand Journal of Public Health. https://doi.org/10.1111/1753-6405.13066

- A systematic review and meta-analysis including 13 studies (8 of which are US-based) found that the pooled baseline SARS-CoV-2 prevalence among homeless shelter is 2.1% among residents and 1.7% among staff. However, in outbreaks, the prevalence increases to 30% among residents and 15% among staff. The main infection prevention and control measures cited included universal and rapid testing, bed spacing, and limited staff rotation.

  Mohsenpour et al. (Jan 15, 2021). SARS-Cov-2 Prevalence Transmission Health-Related Outcomes and Control Strategies in Homeless Shelters Systematic Review and Meta-Analysis. Pre-print downloaded Jan 19 from https://doi.org/10.1101/2021.01.14.21249851

- An online survey using the Amazon Mechanical Turk platform (n=2,667) shows that compared to higher-poverty neighborhoods, low-poverty neighborhoods had more health-promoting neighborhood conditions before the COVID-19 pandemic and had more positive changes, such as higher physical activity through increased walking, during the outbreak. A separate analysis shows that mental health problems were linked to the presence of negative neighborhood conditions, such as crime/violence and traffic, as well as to COVID-19 infection and death, and household income level.

  Yang and Xiang. (Jan 9, 2021). Examine the Associations between Perceived Neighborhood Conditions, Physical Activity, and Mental Health during the COVID-19 Pandemic. Health & Place. https://doi.org/10.1016/j.healthplace.2021.102505

Other Resources and Commentaries

- Public Support for European Cooperation in the Procurement, Stockpiling and Distribution of Medicines – European Journal of Public Health (Jan 17)
- SARS-CoV-2 Vaccines: Much Accomplished, Much to Learn – Annals of Internal Medicine (Jan 19)
- Covid-19: US Immigration Enforcement Flouts Safety Guidelines, Report Claims – BMJ (Jan 18)
- Keeping Childhood Immunisation Rates Stable during the COVID-19 Pandemic – The Lancet Infectious Diseases (Jan 15)
- Evaluating Crisis Communication. A 30-Item Checklist for Assessing Performance during COVID-19 and Other Pandemics – Journal of Health Communication (Jan 17)
- Equitable Recovery from COVID-19: Bring Global Commitments to Community Level – BMJ Global Health (Jan 17)
- Covid-19: What New Variants Are Emerging and How Are They Being Investigated? – BMJ (Jan 18)
- Of Ensuring Equitable Participation of Persons with Disabilities during the COVID-19 Pandemic – Journal of Public Health (Jan 18)
- Trust in a COVID-19 Vaccine among People with Substance Use Disorders – Drug and Alcohol Dependence (Jan 11)

- Infographic. COVID-19 RT-PCR Testing for Elite Athletes – British Journal of Sports Medicine (Jan 17)
- Pandemic Fatigue? How Adherence to Covid-19 Regulations Has Been Misrepresented and Why It Matters – BMJ (Jan 18)
- Airborne Transmission of SARS-CoV-2: What We Know – Clinical Infectious Diseases (Jan 18)
- A Plea for Equitable Global Access to COVID-19 Diagnostics, Vaccination and Therapy: The NeuroCOVID-19 Task Force of the European Academy of Neurology – European Journal of Neurology (Jan 18)
- Building Public Trust: A Response to COVID-19 Vaccine Hesitancy Predicament – Journal of Public Health (Jan 18)
- Lessons Learnt in Transitioning from Universal Screening to Universal Testing of Pregnant Patients for SARS-CoV-2 at the Largest Municipal Health System in America – Journal of Perinatology (Jan 18)

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