2019-nCoV Literature Situation Report (Lit Rep)

March 16, 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

- **Only 17% (76 of 436) of solid organ transplant recipients developed detectable antibody responses at a median of 20 days after the first dose of either the Moderna or Pfizer-BioNTech vaccines, according to a convenience sample of US patients. Transplant recipients who were receiving immunosuppression therapy, older transplant recipients, and those vaccinated with the Pfizer-BioNTech vaccine (as compared to the Moderna vaccine) were less likely to develop detectable antibody responses.** More
- **The SARS-CoV-2 P.1 variant which has caused large outbreaks in Brazil is less resistant to neutralization from both convalescent serum and vaccine-induced serum than the B.1.351 variant originally identified in South Africa, despite containing similar receptor binding domain mutations (E484K, K417N/T and N501Y).** More

Non-Pharmaceutical Interventions

- Self-reported adherence to COVID-19 mitigation policies was high in both highly- and minimally-affected regions in the US around the time of the first wave in April 2020, according to representative cross-sectional surveys (n=5,573) administered to adults residing in throughout the US, in New York City and Los Angeles, and Australia. 82% reported adherence to recommended quarantine and stay-at-home policies, and 90% supported government-imposed measures.

  Czeisler et al. (Mar 15, 2021). Early Public Adherence with and Support for Stay-at-Home COVID-19 Mitigation Strategies despite Adverse Life Impact: A Transnational Cross-Sectional Survey Study in the United States and Australia. BMC Public Health. https://doi.org/10.1186/s12889-021-10410-x

- Closed Circuit Television (CCTV) footage in inner-city Amsterdam, Netherlands showed short-lived adherence to physical distancing measures following implementation of "lockdown" policies. From February to May 2020, the observed number of physical distancing violations (less than 1.5 meters) decreased following announcements of physical distancing measures and full lockdown on March 23rd, but then increased onwards from April 2 until the end of the observation period.

  Hoeben et al. (Mar 15, 2021). Social Distancing Compliance: A Video Observational Analysis. PLOS ONE. https://doi.org/10.1371/journal.pone.0248221

Vaccines and Immunity

- Solid organ transplant recipients in the US were less likely to develop anti-SARS-CoV-2 antibody responses after receiving a single dose of either the Moderna or Pfizer-BioNTech vaccines. In a prospective convenience sample, only 17% (76 of 436) had detectable antibody responses at a median of 20 days after the first dose. Transplant recipients who were receiving immunosuppression therapy, older transplant recipients, and those vaccinated with the Pfizer-BioNTech vaccine (as compared to the Moderna vaccine) were less likely to develop detectable antibody responses.

  Boyarsky et al. (Mar 15, 2021). Immunogenicity of a Single Dose of SARS-CoV-2 Messenger RNA Vaccine in Solid Organ Transplant Recipients. JAMA. https://doi.org/10.1001/jama.2021.4385

- A review of 66 observational studies found that most adults with SARS-CoV-2 infection develop IgM and IgG antibody responses. Among studies measuring IgM antibody responses (n=21 studies), 80% of adults developed responses, peaking at 20 days. Among studies measuring IgG antibody responses (n=24 studies), 95% of adults developed responses, peaking at 25 days and remaining detectable up to 120 days. Studies evaluating neutralizing responses (n=8 studies) were more varied in methodology, but suggest that 99% develop neutralizing antibodies.

  Arkhipova-Jenkins et al. (Mar 16, 2021). Antibody Response After SARS-CoV-2 Infection and Implications for Immunity. Annals of Internal Medicine. https://doi.org/10.7326/M20-7547

- *[Pre-print, not peer-reviewed]* The SARS-CoV-2 P.1 variant, which has caused large outbreaks in Brazil, is less resistant to neutralization from both convalescent serum and vaccine-induced serum than the B.1.351 variant originally identified in South Africa, despite containing similar receptor binding domain (RBD) mutations (E484K, K417N/T and N501Y). Similar to the B.1.351 variant, mutations associated with the P1 variant completely abrogated the binding of multiple neutralizing antibodies directed against the RBD, including a variety of antibodies currently in development for therapeutic use. In contrast, the reduction in neutralization activity of convalescent plasma from recovered volunteers against the P.1 variant was only modest (~3-fold reduction versus the ancestral Victoria strain) when compared to the reduction in neutralization observed with B.1.351 variant (~13-fold reduction versus the Victoria strain). Sera from recipients of either the Pfizer-BioNTech or Oxford-Aztrazeneca vaccine had similar modest reductions in neutralization activity (~3-fold) when compared to the reductions in neutralization observed with the B.1.351 variant (~8-9 fold).

  Dejnirattisai et al. Antibody Evasion by the Brazilian P.1 Strain of SARS-CoV-2. Pre-print downloaded Mar 16 from https://doi.org/10.1101/2021.03.12.435194

- *[Pre-print, not peer-reviewed]* Antibodies induced by the Pfizer-BioNTech vaccine had higher binding capacities (avidity) than antibodies induced by natural infection against the receptor binding domain (RBD) containing mutations representative of circulating SARS-CoV-2 variants of concern (N501Y, K417N, E484K, and a combination of all three). Vaccine-induced sera (n=6) reduced binding against the RBD containing the N501Y and K417 mutations (2.5-3 fold reduction) compared to wild type RBD. Of note, both the RBD with E484K mutation and RBD with all three mutations reduced binding by ~10-fold, indicating that E484K mutation (found in the B.1.351 and P.1 variant but not in the B.1.1.7 variant) substantially reduces antibody binding.

  Chang et al. (Mar 15, 2021). BNT162b2 MRNA COVID-19 Vaccine Induces Antibodies of Broader Cross-Reactivity than Natural Infection but Recognition of Mutant Viruses Is up to 10-Fold Reduced. Pre-print downloaded Mar 16 from https://doi.org/10.1101/2021.03.13.435222

- Previous SARS-COV-2 infection was associated with a lower likelihood of subsequent reinfection compared to those without a previous history of infection. These results are based on a cohort study of over 150,000 patients from a multi-hospital system in Ohio and Florida. Among 8,845 initially PCR-positive patients, 1,278 were retested after ≥90 days and 62 (0.4%) had reinfection (CDC definition of reinfection is a positive test ≥90 days after initial positive test). Of 141,480 initially PCR-negative patients, 39,487 were retested after ≥90 days and 3,191 (2.3%) had positive results. *[EDITORIAL NOTE: This analysis relies on medical records of SARS-CoV-2 PCR testing and does not represent a random sample of people with and without prior SARS-CoV-2 infection. Differences between those who do and do not retest for SARS-CoV-2 after an initial positive or negative test result could greatly affect the observed test positivity. Conclusions based on these findings about the effectiveness of prior infection against re-infection should be made with great caution.]*

  Sheehan et al. (Mar 15, 2021). Reinfection Rates among Patients Who Previously Tested Positive for COVID-19: A Retrospective Cohort Study. Clinical Infectious Diseases. https://doi.org/10.1093/cid/ciab234

Public Health Policy and Practice

- The preterm birth rate in Tennessee was lower in 2020 during the stay-at-home order compared with the 5 preceding years. After adjusting for maternal age, education, race/ethnicity, diabetes, and hypertension the odds for preterm birth in 2020 was 14% lower compared with 2015 to 2019 (10.2% vs 11.3%).

  Harvey et al. (Mar 15, 2021). Association of Preterm Birth Rate With COVID-19 Statewide Stay-at-Home Orders in Tennessee. JAMA Pediatrics. https://doi.org/10.1001/jamapediatrics.2020.6512

- In the context of increased social isolation during the COVID-19, hearing difficulties among older adults were associated with self-reported anxiety, depression, and cognitive function, according to an online survey. Participants (n=80) had a mean age of 76 years and had their hearing measured by the Speech, Spatial and Qualities of Hearing Scale (SSQ12) and were asked questions about socialization, loneliness, depression, and self-perceived cognitive function both pre-and-post pandemic. After adjusting for age, gender, and education, the association of hearing difficulty with cognitive function persisted.

  Littlejohn et al. (Mar 15, 2021). Self-Reported Hearing Difficulties Are Associated with Loneliness, Depression and Cognitive Dysfunction during the COVID-19 Pandemic. International Journal of Audiology. https://doi.org/10.1080/14992027.2021.1894492

- Key themes that drive COVID-19 vaccination intentions including protecting oneself from COVID-19 infection, protecting those who are at risk for severe illness, and having to travel to receive the vaccine, based on an open-ended belief elicitation survey (n=197) conducted in the US. In a quantitative survey informed by qualitative findings, intent to receive the vaccine was most strongly correlated with 'achieving peace of mind', followed by influences from family and friends, and perceived capacity to obtain the vaccine (e.g. traveling to a vaccination site).

  Lueck and Spiers. (Mar 13, 2021). Which Beliefs Predict Intention to Get Vaccinated against COVID-19? A Mixed-Methods Reasoned Action Approach Applied to Health Communication. Journal of Health Communication. https://doi.org/10.1080/10810730.2020.1865488

Other Resources and Commentaries

- Publication Rate and Citation Counts for Preprints Released during the COVID-19 Pandemic: The Good, the Bad and the Ugly – PeerJ (Mar 3)
- SARS-CoV-2 Seroprevalence Data to Guide Local Public Health Interventions – JAMA Internal Medicine (Mar 15)
- Children and the Return to School: How Much Should We Worry about Covid-19 and Long Covid – BMJ (Mar 15)
- Could a Good Night's Sleep Improve COVID-19 Vaccine Efficacy – The Lancet Respiratory Medicine (Mar 12)
- Correcting COVID-19 Vaccine Misinformation – EClinicalMedicine (Mar 6)
- Modelling the Long-Run Learning Impact of the Covid-19 Learning Shock: Actions to (More than) Mitigate Loss – International Journal of Educational Development (Dec 18, 2020)
- COVID-19: An Urgent Call for Coordinated, Trusted Sources to Tell Everyone What They Need to Know and Do – Journal of Health Communication (Mar 13)
- Coordinating COVID-19 Vaccine Deployment through the WHO COVID-19 Partners Platform – Bulletin of the World Health Organization (Mar 1)
- COVID-19 Vaccines: Resolving Deployment Challenges – Bulletin of the World Health Organization (Mar 1)
- Public Discourse Against Masks in the COVID-19 Era: Infodemiology Study of Twitter Data (Preprint) – JMIR Public Health and Surveillance (Mar 16, 2021)

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