2019-nCoV Literature Situation Report (Lit Rep)

May 17, 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

- **Interim results from a large study of US healthcare personnel indicated that one dose of either the Pfizer-BioNTech or Moderna vaccines was 82% effective against symptomatic COVID-19 and 2 doses were 94% effective.** More
- **On May 12th, 2021, the Advisory Committee on Immunization Practices made an interim recommendation for the use of the Pfizer-BioNTech vaccine among adolescents aged 12-15, following the FDA expansion of the Emergency Use Authorization eligibility to include this age group.** More
- **Analysis of sera from participants in the Moderna vaccine trial (n=24) found that most maintained both binding and functional antibodies against the B.1.1.7, B.1.351, P.1, B.1.429, and B.1.526 SARs-CoV-2 variants for 6 months, although at lower levels relative to wildtype and D614G.** More
- **The SARS-CoV-2 B.1.617 and B.1.618 strains currently circulating in India were somewhat resistant to neutralization by sera from convalescent individuals, vaccine-elicited antibodies, and therapeutic monoclonal antibodies; but not enough to suggest that current vaccines will not be protective.** More

Transmission

- A surveillance study conducted between March 1, 2020 and February 21, 2021 in the UK found that out of 1,427 pediatric patients admitted to the hospital, 80 (5.6%) tested positive for SARS-CoV-2, of which 52 (65%) had symptoms compatible with COVID-19, 16 (20%) were asymptomatic, and 12 (15%) were "unclear" because of overlapping symptoms between COVID-19 and a co-occurring illness. During months when schools were open (June, September-December), there was a 1.65-fold increase in the mean percentage of new asymptomatic SARS-CoV-2 infections among admitted children compared to when schools were closed (March-May, July-August, January-February).

  Mann et al. (May 2021). Asymptomatic SARS-CoV-2-Infected Children Attending Hospital with Non-COVID-19 Diagnoses, March 2020-February 2021. Journal of Infection. https://doi.org/10.1016/j.jinf.2021.05.002

Testing and Treatment

- Among patients hospitalized with COVID-19, convalescent plasma treatment did not improve 28-day mortality (RR = 1.0), time to hospital discharge (RR = 0.99), or result in a significant difference in the proportion of patients who either received invasive mechanical ventilation or died (RR = 0.99), according to results from the RECOVERY trial in the UK. 1399 (24%) of 5795 patients in the convalescent plasma group and 1408 (24%) of 5763 patients in the usual care group died within 28 days, and the mortality rate ratio was similar among all prespecified subgroups of patients, including those who did not have detectable SARS-CoV-2 antibodies at randomization. *[EDITORIAL NOTE: A pre-print related to this manuscript was summarized on March 11, 2021].*

  Horby et al. (May 14, 2021). Convalescent Plasma in Patients Admitted to Hospital with COVID-19 (RECOVERY): A Randomised Controlled, Open-Label, Platform Trial. The Lancet. https://doi.org/10.1016/S0140-6736(21)00897-7

- *[Pre-print, not peer-reviewed]* A cohort study conducted at four US universities between September 2020 and February 2021 found that a seven-day quarantine period may not be sufficient to maintain a 5% transmission risk threshold, and that risk depends on the strictness of quarantine measures. The study compared "strict quarantine", which included designated housing with private rooms and meal delivery, versus "non-strict quarantine", which allowed individuals to interact with other household members. Among 418 individuals who were quarantined and who eventually tested positive, 11%, 4.2%, and 1.2% were negative and asymptomatic on days 7, 10 and 14, respectively. 6% of individuals tested positive after day 7 in strict quarantine, versus 14% in non-strict quarantine, which may have been explained by exposure during the quarantine period.

  Liu et al. (May 15, 2021). Seven-Day COVID-19 Quarantine May Be Too Short Assessing Post-Quarantine Transmission Risk in Four University Cohorts. Pre-print downloaded May 17 from https://doi.org/10.1101/2021.05.12.21257117

Vaccines and Immunity

- *[Pre-print, not peer-reviewed]* A longitudinal study of antibody responses among healthcare workers in France, 916 of whom had not had COVID-19 and 393 who were convalescent, found that almost all convalescent individuals (96%) had persistence of anti-S IgG antibodies one year after infection. From month 1 until months 7-9 after infection, SARS-CoV-2 antibodies decreased, with men showing a slower decay of anti-N and a faster decay of anti-S antibodies than women. By months 11-13, anti-N decreased while anti-S stabilized. 69 individuals who were SARS-CoV-2 negative at baseline eventually tested positive, (incidence of 12.22 per 100 person-years) versus one with prior infection (0.40 per 100 person-years), for a relative reduction in the incidence of SARS-CoV-2 reinfection of 96.7%. After vaccination, anti-S antibodies significantly increased to levels found to neutralize the D614G, B.1.1.7, and B.1.351 variants in the subset of isolates tested, with antibody level independent of pre-vaccination IgG levels, type of vaccine, and number of doses.

  Gallais et al. (May 14, 2021). Anti-SARS-CoV-2 Antibodies Persist for up to 13 Months and Reduce Risk of Reinfection. Pre-print downloaded May 17 from https://doi.org/10.1101/2021.05.07.21256823

- A case-control study of the effectiveness of the Pfizer-BioNTech and Oxford-AstraZeneca vaccines among adults aged 70 and older (n = 156,930) found that one dose of either vaccine was about 80% effective at preventing hospital admission with COVID-19, and a single dose of Pfizer-BioNTech was

85% effective at preventing death (follow-up was insufficient to assess the effect of Oxford-AstraZeneca on mortality), with protection maintained for at least 6 weeks.

Lopez Bernal et al. (May 13, 2021). Effectiveness of the Pfizer-BioNTech and Oxford-AstraZeneca Vaccines on Covid-19 Related Symptoms, Hospital Admissions, and Mortality in Older Adults in England: Test Negative Case-Control Study. BMJ. https://doi.org/10.1136/bmj.n1088

- *[Pre-print, not peer-reviewed]* An analysis of sera from participants in the Moderna vaccine trial (n=24) found that most individuals maintained both binding and functional antibodies against the B.1.1.7, B.1.351, P.1, B.1.429, and B.1.526 SARs-CoV-2 variants for 6 months, although at lower levels relative to wildtype and D614G. The B.1.1.7 lineage had little impact on antibody recognition and function, while B.1.351 had a greater effect, ranging from 3 to 15-fold reductions, and the other variants had intermediate impacts. The authors posit that the differential effects of the B.1.351 mutation on antibody response may be due to certain immune pressures that favor mutations like E484K.

  Pegu et al. (May 16, 2021). Durability of MRNA-1273-Induced Antibodies against SARS-CoV-2 Variants. Pre-print downloaded May 17 from https://doi.org/10.1101/2021.05.13.444010

- Among US healthcare personnel, one dose of either the Pfizer-BioNTech or Moderna vaccines was 82% effective against symptomatic COVID-19, and 2 doses were 94% effective. Interim results from a test-negative case-control study conducted in 25 states and enrolling 623 case-patients and 1,220 controls as of March 18, 2021 indicate that vaccine effectiveness is similar to vaccine efficacy reported in clinical trials. The effectiveness of a single dose was measured during the interval from 14 days after the first dose through 6 days after the second dose.

  Pilishvili et al. (May 14, 2021). Interim Estimates of Vaccine Effectiveness of Pfizer-BioNTech and Moderna COVID-19 Vaccines Among Health Care Personnel — 33 U.S. Sites, January–March 2021. MMWR. Morbidity and Mortality Weekly Report.
  https://doi.org/10.15585/mmwr.mm7020e2

- The risk of SARS-CoV-2 reinfection among college students with prior infection was 2.2% (n = 16,101, 2,021 with and 14,080 without previous infection), while estimated protection from previous infection was 84% among students tested in fall 2020 and spring 2021 semesters at a large university in South Carolina. All students with access to main campus facilities were required to receive PCR testing in the fall, and students living in university housing were retested weekly. The median time to reinfection was 129 days, or about 4 months.

  Rennert and McMahan. (May 16, 2021). Risk of SARS-CoV-2 Reinfection in a University Student Population. Clinical Infectious Diseases. https://doi.org/10.1093/cid/ciab454

- *[Pre-print, not peer-reviewed]* Among solid organ transplant recipients (n = 40) and age-matched controls (n = 70), antibodies were detected in only 5% of transplant recipients versus 80% of controls, though specific CD4 and/or CD8 T-cells were more frequently found in both transplant recipients (24%) and controls (84%). IgG and neutralization activity were also higher after vaccination with one of the mRNA vaccines compared to the Oxford-AstraZeneca vaccine, while CD4 and CD8 T-cell levels were higher after the Oxford-AstraZeneca vaccine. The authors suggest that antibody assessments alone are not sufficient to identify a vaccine response, and analyses of both humoral and cellular immunity will be important.

Schmidt et al. (May 14, 2021). Cellular Immunity Predominates over Humoral Immunity after the First Dose of COVID-19 Vaccines in Solid Organ Transplant Recipients. Pre-print downloaded May 17 from https://doi.org/10.1101/2021.05.07.21256809

- *[Pre-print, not peer-reviewed]* The SARS-CoV-2 B.1.617 and B.1.618 strains currently circulating in India were found to have specific spike protein mutations (B.1.617 = L452R/E484Q/D614G/P681R, B.1.618 = Δ145-146/E484K/D614G) that were somewhat resistant to neutralization by sera from convalescent individuals, vaccine-elicited antibodies, and therapeutic monoclonal antibodies; but not enough to suggest that current vaccines will not be protective. A study generating pseudoviruses found that those with B.1.617 and B.1.618 spike proteins had an average of 3.9-fold and 2.7-fold reductions in the half maximal inhibitory concentration for convalescent sera and antibodies from the Pfizer-BioNTech and Moderna vaccines, respectively, which the authors suggest could be due to the L452R, E484Q, and E484K mutations. Both variants also had some resistance to the monoclonal antibodies made by Regeneron.

  Tada et al. (May 16, 2021). The Spike Proteins of SARS-CoV-2 B.1.617 and B.1.618 Variants Identified in India Provide Partial Resistance to Vaccine-Elicited and Therapeutic Monoclonal Antibodies. Pre-print downloaded May 17 from https://doi.org/10.1101/2021.05.14.444076

- *[Pre-print, not peer-reviewed]* Among patients with cancer (n = 201) who were fully vaccinated with the Pfizer-BioNTech, Moderna, or Johnson & Johnson/Janssen vaccines, the majority (94%) showed seroconversion for anti-spike protein IgG. Lower seroconversion frequencies were observed for patients with hematological malignancies (85%), particularly recipients of anti-CD20 therapies (70%) and stem cell transplantation (74%), compared to patients with solid organ tumors (98%). Patients receiving immune checkpoint inhibitor therapy (97%) or hormonal therapies (100%) also had high seroconversion. Overall, IgG titers were higher among those who received mRNA vaccines.

  Thakkar et al. (May 14, 2021). Seroconversion Rates Following COVID-19 Vaccination amongst Patients with Malignant Disease- the Impact of Diagnosis and Cancer-Directed Therapies. Pre-print downloaded May 17 from https://doi.org/10.1101/2021.05.07.21256824

- On May 12th, 2021, the Advisory Committee on Immunization Practices (ACIP) made an interim recommendation for the use of the Pfizer-BioNTech vaccine among adolescents aged 12-15, following the expansion of the FDA Emergency Use Authorization age eligibility to include this age group. The ACIP considered evidence from a systematic review of published and unpublished evidence of benefits and harms, the importance of COVID-19 as a public health concern, and issues regarding resource use and patients' and parents' values and preferences. Evidence was primarily guided by a randomized, double-blind, placebo-controlled Phase II/III clinical trial that found 100% efficacy in preventing symptomatic, laboratory-confirmed COVID-19 in adolescents aged 12–15 years without evidence of previous SARS-CoV-2 infection.

  Wallace et al. (May 14, 2021). The Advisory Committee on Immunization Practices' Interim Recommendation for Use of Pfizer-BioNTech COVID-19 Vaccine in Adolescents Aged 12–15 Years — United States, May 2021. MMWR. Morbidity and Mortality Weekly Report. https://doi.org/10.15585/mmwr.mm7020e1

Clinical Characteristics and Health Care Setting

- A retrospective cohort study found that among 12,306 pediatric patients with lab-confirmed COVID-19 in the US, 5% were hospitalized, 18% needed critical care services and 4% required mechanical ventilation. 14% experienced gastrointestinal symptoms, 8% had dermatological

symptoms (rash), 5% had headache, and 19% had other symptoms (fever, malaise, myalgia, arthralgia and altered smell or taste). The risk of hospitalization was higher among non-Hispanic Black (RR = 2.0) and Hispanic children (RR = 1.3) compared with non-Hispanic white children.

Parcha et al. (May 2021). A Retrospective Cohort Study of 12,306 Pediatric COVID-19 Patients in the United States. Scientific Reports. https://doi.org/10.1038/s41598-021-89553-1

Mental Health and Personal Impact

- Patients experiencing COVID-19-related post-traumatic stress disorder (PTSD) and depression had a higher burden of persistent physical symptoms and were less likely to report feeling recovered 3 months after illness onset, according to a study of adults hospitalized between March 26 and May 27, 2020 in New York. Thirty-six percent of patients reported full recovery from COVID-19 at follow-up, 24% had COVID-related PTSD, 18% had depression, and 12% met the criteria for both. The most common persistent physical symptoms were body aches (24%), fatigue (20%), shortness of breath (19%), and headache (13%). In adjusted models, the association between depression and physical symptoms became nonsignificant (OR = 3.1) while the association remained borderline significant for PTSD and physical symptoms (OR = 4.9).

  Liyanage-Don et al. (May 13, 2021). Psychological Distress, Persistent Physical Symptoms, and Perceived Recovery After COVID-19 Illness. Journal of General Internal Medicine. https://doi.org/10.1007/s11606-021-06855-w

Modeling and Prediction

- *[Pre-print, not peer-reviewed]* A SIR model simulating the impact of vaccine passes or passports on SARS-CoV-2 dynamics found that different restrictions for passholders and unvaccinated individuals can result in a wide variety of epidemic trajectories, some of which may introduce new waves of infections. For example, while passholders may have fewer restrictions initially compared to the rest of the population, the authors assumed that immunity would wane over time, necessitating re-vaccination or further restrictions among vaccinated persons. The authors concluded that lowering restrictions for vaccine passholders would only be effective in the context of strict restrictions for other members of the population.

  Krueger et al. (May 14, 2021). Risk of COVID-19 Epidemic Resurgence with the Introduction of Vaccination Passes. Pre-print downloaded May 17 from https://doi.org/10.1101/2021.05.07.21256847

Public Health Policy and Practice

- A study evaluating COVID-19 restrictions in the Netherlands between January and June 2020 found disruptions in clinical HIV care. During lockdown (March 16th through May 31st), there was a significant reduction in the weekly number of HIV tests. The proportion of individuals newly diagnosed with HIV was also lower during lockdown, with a higher proportion presenting with advanced disease at entry to clinical care. The number of patients with HIV indicator conditions each month, such as hepatitis B/C, cervical dysplasia/cancer, and lymphoma, who entered care also decreased disproportionately between January and April, which the authors suggest may be due to closure of public health centers, patient delay due to fear of contracting SARs-CoV-2, and increased barriers to consulting with general practitioners.

  Hensley et al. (May 16, 2021). Significant Impact of COVID-19 on HIV Care in Hospitals Affecting the First Pillar of the HIV Care Continuum. Clinical Infectious Diseases. https://doi.org/10.1093/cid/ciab445

Other Resources and Commentaries

- Accessibility Evaluation of COVID-19 Vaccine Registration Websites across the United States – Journal of the American Medical Informatics Association (May)
- Israel's COVID-19 Endgame – Science (May)
- COVID-19 Outbreak Rates and Infection Attack Rates Associated with the Workplace a Descriptive Epidemiological Study – MedRxiv (May 14)
- Spreading of a New SARS-CoV-2 N501Y Spike Variant in a New Lineage – Clinical Microbiology and Infection (May)
- Covid-19: India Sees Record Deaths as "Black Fungus" Spreads Fear – BMJ (May 13)
- Serbia Begins Paying Citizens to Receive a COVID-19 Vaccine – Lancet (May)
- Vaccinating Children against SARS-CoV-2 – BMJ (May)
- Delaying a COVID Vaccine's Second Dose Boosts Immune Response – Nature (May 13)
- Data Discrepancies and Substandard Reporting of Interim Data of Sputnik V Phase 3 Trial – Authors' Reply – The Lancet (May)
- Evaluating the Presence of Replication-Competent SARS-CoV-2 from Nursing Home Residents with Persistently Positive RT-PCR Results – Clinical Infectious Diseases (May 14)
- Comparable Environmental Stability and Disinfection Profiles of the Currently Circulating SARS-CoV-2 Variants of Concern B.1.1.7 and B.1.351 – The Journal of Infectious Diseases (May 16)
- SARS-CoV-2 Variant of Concern Substitutions Alter Spike Glycoprotein Receptor Binding Domain Structure and Stability – BioRxiv (May 14)
- Amplifying Inequity: The Compounding Impact of COVID-19 and Violence – Journal of the National Medical Association (Apr)
- Trends in Filled Naloxone Prescriptions Before and During the COVID-19 Pandemic in the United States – JAMA Health Forum (May 14)
- Tocilizumab for the Treatment of Severe COVID-19 – Nature Medicine (May 13)
- Safety and Antibody Response to the First Dose of SARS-CoV-2 Messenger RNA Vaccine in Persons with HIV – AIDS (May 14)
- Comparative Systematic Review and Meta-Analysis of Reactogenicity, Immunogenicity and Efficacy of Vaccines against SARS-CoV-2 – NPJ Vaccines (May 13)

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