

COVID-19 Resource Desk

#57 | 5.22.2021 to 5.29.2021

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New Research

*note, **PREPRINTS** have not undergone formal peer review

COVID-19 related publications by Providence caregivers – see [Digital Commons](#)

Basic Science / Virology / Pre-clinical

- 1. SARS-CoV-2 B.1.1.7 and B.1.351 spike variants bind human ACE2 with increased affinity.** Ramanathan M, et al. *Lancet Infect Dis*. 2021 May 19:S1473-3099(21)00262-0. doi: 10.1016/S1473-3099(21)00262-0. [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(21\)00262-0/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00262-0/fulltext)
Genomic surveillance efforts have uncovered SARS-CoV-2 variants with mutations in the viral spike glycoprotein, which binds the human angiotensin-converting enzyme 2 (ACE2) receptor to facilitate viral entry. Such variants represent a public health challenge during the COVID-19 pandemic because they increase viral transmission and disease severity. The B.1.351 variant, first identified in South Africa, has three notable mutations in the spike receptorbinding domain (RBD)—namely, K417N, E484K, and N501Y3—whereas the B.1.1.7 variant, first identified in the UK, carries the N501Y mutation. B.1.351 is of particular concern for its potential resistance to antibodies elicited by previous SARS-CoV-2 infection and vaccination.
- 2. Structural and functional ramifications of antigenic drift in recent SARS-CoV-2 variants.** Yuan M, et al. *Science*. 2021 May 20:eabh1139. doi: 10.1126/science.abh1139. <https://science.sciencemag.org/content/early/2021/05/19/science.abh1139>
Neutralizing antibodies (nAbs) elicited against the receptor-binding site (RBS) of the spike protein of wild-type SARS-CoV-2 are generally less effective against recent variants of concern. RBS residues E484, K417 and N501 are mutated in variants first described in South Africa (B.1.351) and Brazil (P.1). We analyzed their effects on ACE2 binding and K417N and E484K mutations on nAbs isolated from COVID-19 patients. Binding and neutralization of the two most frequently elicited antibody families (IGHV3-53/3-66 and IGHV1-2), which can both bind the RBS in alternate binding modes, are abrogated by K417N, E484K, or both. These effects can be structurally explained by their extensive interactions with RBS nAbs. However, nAbs to the more conserved, cross-neutralizing CR3022 and S309 sites were largely unaffected. The results have implications for next-generation vaccines and antibody therapies.

Clinical Syndrome

- 3. International Prospective Registry of Acute Coronary Syndromes in Patients With COVID-19.** Kite TA et al. *J Am Coll Cardiol.* 2021 May 25;77(20):2466-2476. doi: 10.1016/j.jacc.2021.03.309. <https://www.sciencedirect.com/science/article/pii/S0735109721010792>
In this multicenter international registry, COVID-19-positive ACS patients presented later and had increased in-hospital mortality compared with a pre-COVID-19 ACS population. Excessive rates of and mortality from cardiogenic shock were major contributors to the worse outcomes in COVID-19 positive STEMI patients.

Diagnostics & Screening

- 4. Diagnostic performance and clinical application of preoperative COVID-19 bedside testing with ID NOW™.** Tauh T, et al. *Can J Anaesth.* 2021 May 21. doi: 10.1007/s12630-021-02035-w. <https://link.springer.com/content/pdf/10.1007/s12630-021-02035-w.pdf>
Overall, the ID NOW COVID-19 performed well in a primarily asymptomatic preoperative population, and likely performs better with a higher population prevalence. In situations where urgent invasive intervention is required before NP results can be established and a positive result would change precautions management and workflow, the ID NOW COVID-19 test should be considered to assist with early identification of potentially infectious COVID-19 patients.
- 5. Same-day SARS-CoV-2 antigen test screening in an indoor mass-gathering live music event: a randomised controlled trial.** Revollo B, et al. *Lancet.* May 27, 2021DOI:[https://doi.org/10.1016/S1473-3099\(21\)00268-1](https://doi.org/10.1016/S1473-3099(21)00268-1)
[https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(21\)00268-1/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00268-1/fulltext)
To our knowledge, this is the first randomised clinical trial that assesses the risk of COVID-19 transmission in an indoor mass-gathering live concert done under comprehensive safety measures, including same-day SARS-CoV-2 screening with antigen-detecting rapid diagnostic tests (Ag-RDTs), compulsory N95 face mask wearing, and optimised air ventilation. Participants could sing and dance in the concert hall room, and no physical distancing was recommended. None of the 465 participants became infected, compared with two out of 495 in the control arm. Our study provides preliminary evidence on the effectiveness of same-day point-of-care screening with Ag-RDT, combined with face mask-wearing and active air ventilation, to create safe indoor environments with no need for physical distancing measures. Future studies with a larger capacity of attendees and assistants and done during periods of increased transmission of COVID-19 are warranted.

Epidemiology & Public Health

- 6. Public Trust and Willingness to Vaccinate Against COVID-19 in the US from October 14, 2020, to March 29, 2021.** Daly M, et al. *JAMA.* 2021 May 24. doi: 10.1001/jama.2021.8246. <https://jamanetwork.com/journals/jama/fullarticle/2780519>
After increased reluctance to vaccinate in 2020, this nationally representative study showed a longitudinal decline in reported vaccine hesitancy in late 2020 and early 2021. Reduced

hesitancy occurred in tandem with the regulatory approval of COVID-19 vaccines and rollout of mass vaccination programs. A significant decline in vaccine hesitancy was reported across all demographic groups, especially Black and Hispanic participants. This decrease is important because COVID-19 vaccine acceptance has been particularly low among these groups, who have experienced a disproportionate burden of severe illness and death because of COVID-19. Declines in hesitancy were reported alongside an increase in public trust in vaccine development and the governmental approval process.

7. **Serial intervals and case isolation delays for COVID-19: a systematic review and meta-analysis.** Ali ST, Y et al. *Clin Infect Dis*. 2021 May 26:ciab491. doi: 10.1093/cid/ciab491.

<https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab491/6284329>

Of 103 unique studies identified on serial intervals of COVID-19, serial interval estimates varied from 1.0 to 9.9 days, while case isolation delays varied from 1.0 to 12.5 days which were associated with spatial, methodological and temporal factors. In mainland China, the pooled mean serial interval was 6.2 days before the epidemic peak and reduced to 4.9 days after the epidemic peak. Similarly, the pooled mean isolation delay related intervals were 6.0 days and 2.4 days before and after the epidemic peak, respectively. There was a positive association between serial interval and case isolation delay. Temporal factors, such as different control measures and case isolation in particular led to shorter serial interval estimates over time. Correcting transmissibility estimates for these time-varying distributions could aid mitigation efforts.

Healthcare Delivery & Healthcare Workers

8. **GW COVID-19 NATIONAL HEALTH WORKER SURVEY.** *The George Washington University Milken School of Public Health*. 2021 May. <https://publichealth.gwu.edu/pdf/COVID-19-HCW-Report-051821.pdf>

This report summarizes results of a national COVID-19 health care worker (HCW) anonymous online survey conducted by students and staff with support from faculty mentors of the Department of Environmental and Occupational Health at The George Washington University Milken Institute School of Public Health. The survey was launched in May 2020 to capture the COVID-19 related workplace experiences of a group of HCWs, frontline US workers who have worked since the onset of the pandemic to provide care for millions of Americans. This report discusses survey responses of 1,200 HCWs collected during May and June 2020.

9. **Nurse Sensitive Indicators and How COVID-19 Influenced Practice Change.** Grimley KA, et al. *Nurse Lead*. 2021 May 20. doi: 10.1016/j.mnl.2021.05.003.

<https://www.sciencedirect.com/science/article/pii/S1541461221001002>

As the CNOs reflected on lessons learned, critical themes around the nursing workforce and workforce exhaustion emerged. Efforts to care for the most critical patients at hand, resulted in the use of alternative staffing and patient care strategies throughout the COVID-19 pandemic. As outlined throughout this manuscript, these staffing strategies, may be rife with unintended, negative patient care impacts. For example, the redeployment of surveillance nurses to acute care assignments during the pandemic disrupted the routine monitoring of NSIs without an

alternative solution. Moreover, nurses unfamiliar with the environments and the general nature of care delivery created increased opportunities for deviation from standard practice, thereby increasing the possibility of missed or disrupted care, along with increased stress in the nursing workforce. (6) Additionally, CNOs noted signs of nurse fatigue and burnout as COVID-19 pandemic has worn on, creating risk for staff and patients. To ensure success in future disruptions, the CNO must consider a flexible workforce model for the future. Enforcing care bundles and maintaining standard practice, even through disruption, are key to ensuring that patient outcomes remain stable. COVID-19 has been the most significant disruptor in healthcare, but it will not be the last.

10. **Prevalence and correlates of stress and burnout among U.S. healthcare workers during the COVID-19 pandemic: A national cross-sectional survey study.** Prasad K, et al. *EClinicalMedicine*. 2021 May 16;35:100879. doi: 10.1016/j.eclinm.2021.100879. eCollection 2021 May. [https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(21\)00159-0/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(21)00159-0/fulltext)
Stress is higher among nursing assistants, medical assistants, social workers, inpatient workers, women and persons of color, is related to workload and mental health, and is lower when feeling valued.

Prognosis

11. **Covid-19 in hospitalized lung and non-lung solid organ transplant recipients: a comparative analysis from a multicenter study.** Goldman Jason D, UW Covid-19 SOT Study Team, et al [Providence author]. *Am J Transplant*. 2021 May 19. doi: 10.1111/ajt.16692. <https://onlinelibrary.wiley.com/doi/10.1111/ajt.16692>
Among SOTR hospitalized for Covid-19, LTR had higher mortality than non-lung SOTR. In LTR, single lung transplant and chronic allograft dysfunction were independently associated with mortality.
12. **Early Bacterial Identification among Intubated Patients with COVID-19 or Influenza Pneumonia: A European Multicenter Comparative Cohort Study.** Rouze A et al. *Am J Respir Crit Care Med*. 2021 May 26. doi: 10.1164/rccm.202101-00300C. <https://www.atsjournals.org/doi/abs/10.1164/rccm.202101-00300C>
Bacterial identification within 48h after intubation is significantly less frequent in patients with SARS-CoV-2 pneumonia as compared to patients with influenza pneumonia.
13. **Relationship between ventilator-associated pneumonia and mortality in COVID-19 patients: a planned ancillary analysis of the coVAPid cohort.** Nseir S et al. *Crit Care*. 2021 May 25;25(1):177. doi: 10.1186/s13054-021-03588-4. <https://ccforum.biomedcentral.com/articles/10.1186/s13054-021-03588-4>
VAP was associated with significantly increased 28-day mortality rate in SARS-CoV-2 patients. However, SARS-CoV-2 pneumonia, as compared to influenza pneumonia or no viral infection, did not significantly modify the relationship between VAP and 28-day mortality.

Survivorship & Rehabilitation

14. **Post-COVID syndrome in non-hospitalised patients with COVID-19: a longitudinal prospective cohort study.** Augustin M et al. *Lancet Reg Health Eur.* 2021 Jul;6:100122. doi: 10.1016/j.lanepe.2021.100122. Epub 2021 May 18.
[https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762\(21\)00099-5/fulltext](https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762(21)00099-5/fulltext)
The on-going presence of either shortness of breath, anosmia, ageusia or fatigue as long-lasting symptoms even in non-hospitalised patients was observed at four and seven months post-infection and summarised as post-COVID syndrome (PCS). The continued assessment of patients with PCS will become a major task to define and mitigate the socioeconomic and medical long-term effects of COVID-19.
15. **Assessment of the Frequency and Variety of Persistent Symptoms among Patients With COVID-19: A Systematic Review.** Nasserie T, et al. *JAMA Netw Open.* 2021 May 3;4(5):e2111417. doi: 10.1001/jamanetworkopen.2021.11417.
<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2780376>
This systematic review found that COVID-19 symptoms commonly persisted beyond the acute phase of infection, with implications for health-associated functioning and quality of life. Current studies of symptom persistence are highly heterogeneous, and future studies need longer follow-up, improved quality, and more standardized designs to reliably quantify risks.
16. **Prevalence of Clinical and Subclinical Myocarditis in Competitive Athletes with Recent SARS-CoV-2 Infection: Results from the Big Ten COVID-19 Cardiac Registry.** Daniels CJ et al. *JAMA Cardiol.* 2021 May 27. doi: 10.1001/jamacardio.2021.2065.
<https://jamanetwork.com/journals/jamacardiology/fullarticle/2780548>
In this cohort study of 1597 US competitive athletes with CMR screening after COVID-19 infection, 37 athletes (2.3%) were diagnosed with clinical and subclinical myocarditis. Variability was observed in prevalence across universities, and testing protocols were closely tied to the detection of myocarditis. Variable ascertainment and unknown implications of CMR findings underscore the need for standardized timing and interpretation of cardiac testing. These unique CMR imaging data provide a more complete understanding of the prevalence of clinical and subclinical myocarditis in college athletes after COVID-19 infection. The role of CMR in routine screening for athletes safe return to play should be explored further.

Therapeutics

17. **Tocilizumab in COVID-19: a meta-analysis, trial sequential analysis, and meta-regression of randomized-controlled trials.** Snow TAC, et al. *Intensive Care Med.* 2021 May 21. doi: 10.1007/s00134-021-06416-z.
<https://link.springer.com/article/10.1007%2Fs00134-021-06416-z>
For hospitalized COVID-19 patients, there is some evidence that tocilizumab use may be associated with a short-term mortality benefit, but further high-quality data are required. Its benefits may also lie in reducing the need for mechanical ventilation.

- 18. Medication Use Patterns in Hospitalized Patients With COVID-19 in California During the Pandemic.** Watanabe JH, et al. *JAMA Netw Open*. 2021 May 3;4(5):e2110775. doi: 10.1001/jamanetworkopen.2021.10775.
<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2780277>
This cohort study found that, early in the COVID-19 pandemic, antimicrobials azithromycin and hydroxychloroquine were each used in more than 40% of hospitalized patients. By June, use was below 30% and 5%, respectively. Enoxaparin use remained above 50% throughout 2020, perhaps because enoxaparin serves both for thrombosis prophylaxis and thrombophilia treatment triggered by COVID-19. Dexamethasone and remdesivir use grew substantially. One possible explanation is that remdesivir use may have corresponded with availability, as early in the pandemic it was predominantly available through trials in the UC system. Hydroxychloroquine use fell from over 40% to below 5% 2 months later. A small study conducted early in the pandemic favored use of hydroxychloroquine, but later, larger controlled studies found no benefit.
- 19. Vitamin D supplementation for the treatment of COVID-19: a living systematic review.** Stroehlein JK, et al. *Cochrane Database Syst Rev*. 2021 May 24;5:CD015043. doi: 10.1002/14651858.CD015043.
<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD015043/full>
There is currently insufficient evidence to determine the benefits and harms of vitamin D supplementation as a treatment of COVID-19. The evidence for the effectiveness of vitamin D supplementation for the treatment of COVID-19 is very uncertain. Moreover, we found only limited safety information, and were concerned about consistency in measurement and recording of these outcomes. There was substantial clinical and methodological heterogeneity of included studies, mainly because of different supplementation strategies, formulations, vitamin D status of participants, and reported outcomes. There is an urgent need for well-designed and adequately powered randomised controlled trials (RCTs) with an appropriate randomisation procedure, comparability of study arms and preferably double-blinding. We identified 21 ongoing and three completed studies without published results, which indicates that these needs will be addressed and that our findings are subject to change in the future. Due to the living approach of this work, we will update the review periodically.
- 20. Tracheostomy for COVID-19: Multidisciplinary, Multicenter Data on Timing, Technique, and Outcomes.** Mahmood K, et al. *Ann Surg*. 2021 May 24. doi: 10.1097/SLA.0000000000004955.
https://journals.lww.com/annalsofsurgery/Abstract/9000/Tracheostomy_for_COVID_19_Multidisciplinary,.93543.aspx
Early, percutaneous tracheostomy was associated with improved outcomes compared to surgical tracheostomy in a multi-institutional series of ventilated patients with COVID-19.
- 21. Effectiveness of Tocilizumab in Patients Hospitalized with COVID-19: A Follow-up of the CORIMUNO-TOCI-1 Randomized Clinical Trial.** Mariette X, et al. *JAMA Intern Med*. 2021 May 24. doi: 10.1001/jamainternmed.2021.2209.
<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2780021>

Eight randomized clinical trials of tocilizumab for treating patients with COVID-19 have reported heterogeneous results. Although 4 of them achieved their primary end point, improved 28-day survival was demonstrated only in the 2 largest studies and those with the highest mortality, RECOVERY1 and REMAP-CAP.2 Moreover, only RECOVERY enrolled only patients with elevated C-reactive protein (CRP) levels. The RECOVERY and REMAP-CAP trials involved a high rate of patients using dexamethasone (>80% of the patients in both treatment arms). Differences in trial outcomes may be associated with differences in power, populations, design, management, or length of follow-up.

22. **Efficacy and safety of sofosbuvir/velpatasvir versus the standard of care in adults hospitalized with COVID-19: a single-centre, randomized controlled trial.** Sayad B, et al. *J Antimicrob Chemother.* 2021 May 25;dkab152. doi: 10.1093/jac/dkab152.

<https://academic.oup.com/jac/advance-article/doi/10.1093/jac/dkab152/6284235>

Although treatment with SOF/VEL was safe, adding SOF/VEL to the standard of care did not improve the clinical status or reduce mortality in patients with moderate to severe COVID-19. However, larger randomized clinical trials including more parameters are needed for accurate estimation of the efficacy of SOF/VEL.

23. **Implications of early respiratory support strategies on disease progression in critical COVID-19: a matched subanalysis of the prospective RISC-19-ICU cohort.** Wendel Garcia PD et al. *Crit Care.* 2021 May 25;25(1):175. doi: 10.1186/s13054-021-03580-y.

<https://ccforum.biomedcentral.com/articles/10.1186/s13054-021-03580-y>

In this cohort of critically ill patients with COVID-19, a trial of HFNC appeared to be the most balanced initial respiratory support strategy, given the reduced intubation rate and comparable ICU mortality rate. Nonetheless, considering the uncertainty and stress associated with the COVID-19 pandemic, SOT and early IMV represented safe initial respiratory support strategies. The presented findings, in agreement with classic ARDS literature, suggest that NIV should be avoided whenever possible due to the elevated ICU mortality risk.

24. **Colchicine for community-treated patients with COVID-19 (COLCORONA): a phase 3, randomised, double-blinded, adaptive, placebo-controlled, multicentre trial.** Tardif JC, et al. *Lancet.* May 27, 2021 DOI:[https://doi.org/10.1016/S2213-2600\(21\)00222-8](https://doi.org/10.1016/S2213-2600(21)00222-8)

[https://www.thelancet.com/journals/lanres/article/PIIS2213-2600\(21\)00222-8/fulltext](https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(21)00222-8/fulltext)

In community-treated patients including those without a mandatory diagnostic test, the effect of colchicine on COVID-19-related clinical events was not statistically significant. Among patients with PCR-confirmed COVID-19, colchicine led to a lower rate of the composite of death or hospital admission than placebo. Given the absence of orally administered therapies to prevent COVID-19 complications in community-treated patients and the benefit of colchicine in patients with PCR-proven COVID-19, this safe and inexpensive anti-inflammatory agent could be considered for use in those at risk of complications.

Transmission / Infection Control

25. **Addressing Personal Protective Equipment (PPE) Decontamination: Methylene Blue and Light Inactivates SARS-CoV-2 on N95 Respirators and Medical Masks with Maintenance of Integrity and Fit.** Lendvay TS et al. *Infect Control Hosp Epidemiol*. 2021 May 21:1-83. doi: 10.1017/ice.2021.230. <https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/addressing-personal-protective-equipment-ppe-decontamination-methylene-blue-and-light-inactivates-sarscov2-on-n95-respirators-and-medical-masks-with-maintenance-of-integrity-and-fit/CB86821EEFB7ED0DBE60C1718C39862F>
MBL treatment decontaminated respirators and masks by inactivating three tested coronaviruses without compromising integrity through 5CD. MBL decontamination is effective, low-cost and does not require specialized equipment, making it applicable in all-resource settings.
26. **Estimating infectiousness throughout SARS-CoV-2 infection course.** Jones TC et al. *Science* 2021 May 25. doi: 10.1126/science.abi5273
<https://science.sciencemag.org/content/early/2021/05/24/science.abi5273>
Two elementary parameters for quantifying viral infection and shedding are viral load and whether samples yield a replicating virus isolate in cell culture. We estimate 4.3 days from onset of shedding to peak viral load and cell culture isolation probability. B.1.1.7 subjects had mean log₁₀ viral load 1.05 higher than non-B.1.1.7, with estimated cell culture replication probability 2.6 times higher.
27. **Use of an antiviral mouthwash as a barrier measure in the sars-cov-2 transmission in adults with asymptomatic to mild COVID-19: a multicenter, randomized, double-blind controlled trial.** Carrouel F, et al. *Clin Microbiol Infect*. 2021 May 24:S1198-743X(21)00268-8. doi: 10.1016/j.cmi.2021.05.028. [https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X\(21\)00268-8/fulltext](https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(21)00268-8/fulltext)
This trial supports the relevance of using CDCM on day 1 (4 hours after the initial dose) to reduce the SARS-CoV-2 viral load in saliva. For long term effect (7 days), CDMC appears to provide a modest benefit compared to placebo in reducing viral load in saliva.

Vaccines / Immunology

28. **Patterns in COVID-19 Vaccination Coverage, by Social Vulnerability and Urbanicity — United States, December 14, 2020–May 1, 2021.** Barry V, et al. *MMWR Morb Mortal Wkly Rep*. ePub: 28 May 2021. DOI: <http://dx.doi.org/10.15585/mmwr.mm7022e1>
Disparities in county-level vaccination coverage by social vulnerability have increased as vaccine eligibility has expanded, especially in large fringe metropolitan (areas surrounding large cities, e.g., suburban) and nonmetropolitan counties. By May 1, 2021, vaccination coverage among adults was lower among those living in counties with lower socioeconomic status and with higher percentages of households with children, single parents, and persons with disabilities.

29. **Absence of Humoral Response after Two-Dose SARS-CoV-2 Messenger RNA Vaccination in Patients with Rheumatic and Musculoskeletal Diseases: A Case Series.** Connolly CM, et al. *Ann Intern Med.* 2021 May 25. doi: 10.7326/M21-1451.

<https://www.acpjournals.org/doi/10.7326/M21-1451>

In this case series, we describe the clinical characteristics of 20 patients with RMDs who did not develop detectable anti-RBD antibodies 1 month after SARS-CoV-2 mRNA vaccination. Systemic lupus erythematosus was the most common diagnosis. Rituximab and mycophenolate were the most commonly prescribed disease-modifying therapies. Although rituximab and methotrexate have been shown to reduce humoral response to both influenza and pneumococcal vaccines (4), impairment of vaccine response by other conventional disease-modifying antirheumatic drugs has not been shown. However, mycophenolate has recently been associated with a diminished humoral response to the first dose of SARS-CoV-2 mRNA vaccination in transplant recipients and patients with RMDs

30. **Safety and Immunogenicity of Anti-SARS-CoV-2 Messenger RNA Vaccines in Recipients of Solid Organ Transplants.** Marion O, et al. *Ann Intern Med.* 2021 May 25. doi: 10.7326/M21-1341. <https://jamanetwork.com/journals/jama/fullarticle/2777685>

Immunocompromised individuals have been excluded from studies of SARS-CoV-2 messenger RNA (mRNA) vaccines. In such patients, the immune response to vaccination may be blunted. To better understand the immunogenicity of mRNA vaccines in immunocompromised individuals, we quantified the humoral response to the first dose in solid organ transplant recipients.

31. **Symptoms after COVID-19 Vaccination in Patients with Persistent Symptoms After Acute Infection: A Case Series.** Arnold DT, et al. *Ann Intern Med.* 2021 May 25. doi: 10.7326/M21-1976. <https://www.acpjournals.org/doi/10.7326/M21-1976>

Some patients develop prolonged symptoms after acute SARS-CoV-2 infection. Because the immunologic basis for this is unknown, uncertainty exists about whether vaccination against SARS-CoV-2 might worsen the associated symptoms. Our observations provide reassurance to the increasing number of persons experiencing long-term symptoms after acute SARS-CoV-2 infection that receipt of a messenger RNA or adenoviral vector vaccine is not associated with a decrease in quality of life or worsening of symptoms.

32. **Myocarditis following COVID-19 vaccination.** Albert E, et al. *Radiol Case Rep.* 2021 May 18. doi: 10.1016/j.radcr.2021.05.033. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8130498/>

We report a case of a 24-year-old man who presented to the hospital with acute substernal chest pain, 4 days after his second COVID-19 Moderna vaccination. Laboratory studies revealed elevated troponins and negative viral serologies. Cardiac magnetic resonance imaging (cMRI) demonstrated edema and delayed gadolinium enhancement of the left ventricle in a midmyocardial and epicardial distribution. The patient was diagnosed with myocarditis following Moderna vaccination. Our case report raises concern that myocarditis is a rare side effect of COVID-19 vaccine. Despite our report, it appears that there is a significantly higher risk of cardiac involvement from COVID-19 infection compared to COVID-19 vaccination.

33. **SARS-CoV-2 infection induces long-lived bone marrow plasma cells in humans.** Turner JS, et al. *Nature* (2021). <https://doi.org/10.1038/s41586-021-03647-4>

Here we demonstrate that in patients who experienced mild infections (n=77), serum anti-SARS-CoV-2 spike (S) antibodies decline rapidly in the first 4 months after infection and then more gradually over the following 7 months, remaining detectable at least 11 months after infection. Anti-S antibody titers correlated with the frequency of S-specific BMPCs obtained from bone marrow aspirates of 18 SARS-CoV-2 convalescent patients 7 to 8 months after infection. S-specific BMPCs were not detected in aspirates from 11 healthy subjects with no history of SARS-CoV-2 infection. We demonstrate that S-binding BMPCs are quiescent, indicating that they are part of a long-lived compartment. Consistently, circulating resting memory B cells directed against the S protein were detected in the convalescent individuals. Overall, we show that SARS-CoV-2 infection induces a robust antigen-specific, long-lived humoral immune response in humans.

34. **Effect of 2 Inactivated SARS-CoV-2 Vaccines on Symptomatic COVID-19 Infection in Adults: A Randomized Clinical Trial.** Al Kaabi N et al. *JAMA*. 2021 May 26. doi: 10.1001/jama.2021.8565. <https://jamanetwork.com/journals/jama/fullarticle/2780562>

In this prespecified interim analysis of a randomized clinical trial, treatment of adults with either of 2 inactivated SARS-CoV-2 vaccines significantly reduced the risk of symptomatic COVID-19, and serious adverse events were rare. Data collection for final analysis is pending.

35. **Immune response to SARS-CoV-2 variants of concern in vaccinated individuals.** Becker M et al. *Nat Commun*. 2021 May 25;12(1):3109. doi: 10.1038/s41467-021-23473-6. <https://www.nature.com/articles/s41467-021-23473-6>

Here, we obtain serum and saliva samples from groups of vaccinated (Pfizer BNT-162b2), infected and uninfected individuals and characterize the antibody response to RBD mutant strains. Vaccinated individuals have a robust humoral response after the second dose and have high IgG antibody titers in the saliva. Antibody responses however show considerable differences in binding to RBD mutants of emerging variants of concern and substantial reduction in RBD binding and neutralization is observed against a patient-isolated South African variant. Taken together our data reinforce the importance of the second dose of Pfizer BNT-162b2 to acquire high levels of neutralizing antibodies and high antibody titers in saliva suggest that vaccinated individuals may have reduced transmission potential. Substantially reduced neutralization for the South African variant further highlights the importance of surveillance strategies to detect new variants and targeting these in future vaccines.

36. **Safety, Immunogenicity, and Efficacy of the BNT162b2 Covid-19 Vaccine in Adolescents.** Frenck RW Jr et al. *N Engl J Med*. 2021 May 27. doi: 10.1056/NEJMoa2107456. <https://www.nejm.org/doi/full/10.1056/NEJMoa2107456>

Overall, 2260 adolescents 12 to 15 years of age received injections. BNT162b2 had a favorable safety and side-effect profile, with mainly transient mild-to-moderate reactogenicity (predominantly injection-site pain, fatigue, and headache); there were no vaccine-related serious adverse events and few overall severe adverse events. Among participants without evidence of previous SARS-CoV-2 infection, no Covid-19 cases with an onset of 7 or more days

after dose 2 were noted among BNT162b2 recipients, and 16 cases occurred among placebo recipients. The observed vaccine efficacy was 100%. The BNT162b2 vaccine in 12-to-15-year-old recipients had a favorable safety profile, produced a greater immune response than in young adults, and was highly effective against Covid-19.

37. **Risk of reinfection after seroconversion to SARS-CoV-2: A population-based propensity-score matched cohort study.** SEROCov-POP study group. *Clin Infect Dis.* 2021 May 27:ciab495. doi: 10.1093/cid/ciab495. <https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab495/6287116>

Among 8344 serosurvey participants, 498 seropositive individuals were selected and matched with 996 seronegative controls. After a mean follow-up of 35.6 weeks, 7 out of 498 (1.4%) seropositive subjects had a positive SARS-CoV-2 test, of whom 5 (1.0%) were classified as reinfections. Seroconversion after SARS-CoV-2 infection confers protection against reinfection lasting at least 8 months. These findings could help global health authorities establishing priority for vaccine allocation.

Women & Children

38. **Maternal and perinatal outcomes of pregnant women with SARS-CoV-2 infection at the time of birth in England: national cohort study.** Gurol-Urganci I, et al. *Am J Obstet Gynecol.* 2021 May 20:S0002-9378(21)00565-2. doi: 10.1016/j.ajog.2021.05.016. [https://www.ajog.org/article/S0002-9378\(21\)00565-2/fulltext](https://www.ajog.org/article/S0002-9378(21)00565-2/fulltext)

SARS-CoV-2 infection at the time of birth is associated with higher rates of fetal death, preterm birth, preeclampsia and emergency Cesarean delivery. There were no additional adverse neonatal outcomes, other than those related to preterm delivery. Pregnant women should be counseled regarding risks of SARS-COV-2 infection and should be considered a priority for vaccination.

39. **Risk factors for illness severity among pregnant women with confirmed SARS-CoV-2 infection - Surveillance for Emerging Threats to Mothers and Babies Network, 22 state, local, and territorial health departments, March 29, 2020 -March 5, 2021.** Galang RR et al. *Clin Infect Dis.* 2021 May 22:ciab432. doi: 10.1093/cid/ciab432. <https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab432/6280195>

Older age and having underlying medical conditions were associated with increased risk of moderate-to-severe or critical COVID-19 illness among pregnant women. This information might help pregnant women understand their risk for moderate-to-severe or critical COVID-19 illness and inform targeted public health messaging.

40. **6-month multidisciplinary follow-up and outcomes of patients with paediatric inflammatory multisystem syndrome (PIMS-TS) at a UK tertiary paediatric hospital: a retrospective cohort study.** GOSH PIMS-TS MDT Group. *Lancet Child Adolesc Health.* 2021 May 24:S2352-4642(21)00138-3. doi: 10.1016/S2352-4642(21)00138-3. [https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642\(21\)00138-3/fulltext](https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(21)00138-3/fulltext)

Despite initial severe illness, few organ-specific sequelae were observed at 6 months. Ongoing concerns requiring physical re-conditioning and mental health support remained, and physiotherapy assessments revealed persisting poor exercise tolerance. Longer-term follow-up will help define the extended natural history of PIMS-TS.

FDA / CDC / NIH / WHO Updates

CDC - [COVID-19 Vaccine Breakthrough Infections Reported to CDC — United States, January 1–April 30, 2021](#). *MMWR Morb Mortal Wkly Rep*. ePub: 25 May 2021. DOI: <http://dx.doi.org/10.15585/mmwr.mm7021e3>

CDC - [Myocarditis and Pericarditis Following mRNA COVID-19 Vaccination](#)

FDA - [Coronavirus \(COVID-19\) Update: FDA Authorizes Additional Monoclonal Antibody for Treatment of COVID-19](#), 5-26-21

NIH - [The COVID-19 Treatment Guidelines Panel’s Statement on Baricitinib for the Treatment of Adults With COVID-19](#), updated 5-27-21

Commentary & Press Releases

American Heart Association/American Stroke Association - [COVID-19 vaccine benefits still outweigh risks, despite possible rare heart complications](#)

UK Government – [AZ, Pfizer Vaccines highly effective against B.1.617.2 variant after 2 doses](#)

[Covid-19: D/deaf healthcare workers faced "widespread, systemic discrimination" during pandemic, study finds](#). Mahase E. *BMJ*. 2021 May 26;373:n1365. doi: 10.1136/bmj.n1365.

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