

COVID-19 Resource Desk

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New Research

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

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

Diagnostics & Screening

1. **Diagnostic accuracy of rapid antigen tests in asymptomatic and presymptomatic close contacts of individuals with confirmed SARS-CoV-2 infection: cross sectional study.** Schuit E et al. *BMJ*. 2021 Jul 27;374:n1676. doi: 10.1136/bmj.n1676.
<https://www.bmj.com/content/374/bmj.n1676>

The sensitivities of both rapid antigen tests in asymptomatic and presymptomatic close contacts tested on day 5 onwards after close contact with an index case were more than 60%, increasing to more than 85% after a viral load cut-off was applied as a proxy for infectiousness.

Epidemiology & Public Health

2. **Community SARS-CoV-2 Surge and Within-School Transmission.** Zimmerman KO et al. *Pediatrics*. 2021 Jul 28:e2021052686. doi: 10.1542/peds.2021-052686.
<https://pediatrics.aappublications.org/content/pediatrics/early/2021/07/27/peds.2021-052686.full.pdf>

More than 100,000 students and staff from 13 school districts attended school in person; of these, 4,969 community-acquired SARS-CoV-2 infections were documented by molecular testing. Through contact tracing, NC local health department staff identified an additional 209 infections among >26,000 school close contacts (secondary attack rate <1%). Most within-school transmissions in high schools (75%) were linked to school-sponsored sports. School-acquired cases slightly increased during the surge; however, within-school transmission rates remained constant, from pre-surge to surge, with approximately 1 school-acquired case for every 20 primary cases. CONCLUSIONS: With adherence to basic mitigation strategies, within-school transmission of SARS-CoV-2 can be interrupted, even during a surge of community infections.

3. **Outbreak of SARS-CoV-2 Infections, Including COVID-19 Vaccine Breakthrough Infections, Associated with Large Public Gatherings — Barnstable County, Massachusetts, July 2021.** Brown CM, et al. *MMWR Morb Mortal Wkly Rep*. ePub: 30 July 2021. DOI:
<http://dx.doi.org/10.15585/mmwr.mm7031e2>

In July 2021, following multiple large public events in a Barnstable County, Massachusetts, town, 469 COVID-19 cases were identified among Massachusetts residents who had traveled to the town during July 3–17; 346 **(74%) occurred in fully vaccinated persons**. Testing identified the Delta variant in 90% of specimens from 133 patients. Cycle threshold values were similar among specimens from patients who were fully vaccinated and those who were not.

Healthcare Delivery & Healthcare Workers

- 4. Covid-19 Breakthrough Infections in Vaccinated Health Care Workers.** Bergwerk M et al. *N Engl J Med*. 2021 Jul 28. doi: 10.1056/NEJMoa2109072. <https://www.nejm.org/doi/full/10.1056/NEJMoa2109072>
Among 1497 fully vaccinated health care workers for whom RT-PCR data were available, 39 SARS-CoV-2 breakthrough infections were documented. Most breakthrough cases were mild or asymptomatic, although 19% had persistent symptoms (>6 weeks). The B.1.1.7 (alpha) variant was found in 85% of samples tested. A total of 74% of case patients had a high viral load (Ct value, <30) at some point during their infection; however, of these patients, only 17 (59%) had a positive result on concurrent Ag-RDT. No secondary infections were documented. Among fully vaccinated health care workers, the occurrence of breakthrough infections with SARS-CoV-2 was correlated with neutralizing antibody titers during the peri-infection period.
- 5. Prevalence of Burnout among Respiratory Therapists amidst the COVID-19 Pandemic.** Hinkson CR, et al. [Providence author]. *Respir Care*. 2021 Jul 16:respcare.09283. doi: 10.4187/respcare.09283.
Burnout was common among RTs in the midst of the COVID-19 pandemic. Good leadership was protective against burnout while inadequate staffing, inability to complete work, and burnout climate were associated with burnout.

Prognosis

- 6. Renin-Angiotensin Aldosterone System Inhibitors in Primary Prevention and COVID-19.** Loader J, et al. *J Am Heart Assoc*. 2021 Jul 29:e021154. doi: 10.1161/JAHA.120.021154. <https://www.nejm.org/doi/full/10.1056/nejmsr2005760>
Despite potential limitations, this study is among the best available evidence that RAAS inhibitor use in primary prevention does not increase the risk of severe COVID-19 outcomes; presenting strong data from which scientists and policy makers alike can base, with greater confidence, their current position on the safety of using RAAS inhibitors during the COVID-19 pandemic.

Survivorship & Rehabilitation

- 7. A telerehabilitation programme in post-discharge COVID-19 patients (TERECO): a randomised controlled trial.** Li J, et al. *Thorax*. 2021 Jul 26:thoraxjnl-2021-217382. doi: 10.1136/thoraxjnl-2021-217382. <https://thorax.bmj.com/content/early/2021/07/25/thoraxjnl-2021-217382>

This trial demonstrated superiority of Tereco over no rehabilitation for 6MWD, LMS, and physical HRQOL.

8. **Long covid-mechanisms, risk factors, and management.** Crook H, et al. *BMJ*. 2021 Jul 26;374:n1648. doi: 10.1136/bmj.n1648. <https://www.bmj.com/content/374/bmj.n1648>
The symptoms of long covid include fatigue, dyspnea, cardiac abnormalities, cognitive impairment, sleep disturbances, symptoms of post-traumatic stress disorder, muscle pain, concentration problems, and headache. This review summarizes studies of the long term effects of covid-19 in hospitalized and non-hospitalized patients and describes the persistent symptoms they endure. Risk factors for acute covid-19 and long covid and possible therapeutic options are also discussed.
9. **Post-acute sequelae of SARS-CoV-2 infection and impact on quality of life 1-6 months after illness and association with initial symptom severity.** O'Keefe JB, et al. *Open Forum Infections Diseases* 2021 Jul 27. doi: <https://doi.org/10.1093/ofid/ofab352>
<https://academic.oup.com/ofid/advance-article/doi/10.1093/ofid/ofab352/6328893>
Symptoms following acute COVID-19 are common and may be predicted by factors during the acute phase of illness. Fatigue and neuropsychiatric symptoms figured prominently. Select symptoms seem to be particularly associated with perceptions of physical health following COVID-19 and warrant specific attention on future studies of PASC.
10. **Cognitive deficits in people who have recovered from COVID-19.** Hampshire A, et al. *EClinicalMedicine*. 2021 Jul 23:101044. doi: 10.1016/j.eclinm.2021.101044.
[https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(21\)00324-2/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(21)00324-2/fulltext)
Results accord with reports of 'Long Covid' cognitive symptoms that persist into the early-chronic phase. They should act as a clarion call for further research with longitudinal and neuroimaging cohorts to plot recovery trajectories and identify the biological basis of cognitive deficits in SARS-COV-2 survivors.
11. **Self-reported Memory Problems 8 Months after COVID-19 Infection.** Søråas A, et al. *JAMA Netw Open*. 2021 Jul 1;4(7):e2118717. doi: 10.1001/jamanetworkopen.2021.18717.
<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2782531>
This cohort study examines self-reported memory problems 8 months after COVID-19 infection. At follow-up, 41% of 649 participants in the SARS-CoV-2–positive group reported a significant worsening of health compared with 1 year prior, and 12% of 651 participants also reported problems concentrating. Additionally, 82% of 267 participants in the SARS-CoV-2–positive group who reported memory problems also reported a worsening of health. Feeling depressed, having less energy, or pain was also reported.

Therapeutics

12. **Effect of Canakinumab vs Placebo on Survival without Invasive Mechanical Ventilation in Patients Hospitalized with Severe COVID-19: A Randomized Clinical Trial.** Caricchio R et al.

JAMA. 2021 Jul 20;326(3):230-239. doi: 10.1001/jama.2021.9508.

<https://jamanetwork.com/journals/jama/fullarticle/2782185>

Among patients hospitalized with severe COVID-19, treatment with canakinumab, compared with placebo, did not significantly increase the likelihood of survival without IMV at day 29.

Vaccines / Immunology

- 13. COVID-19 Vaccine Safety in Adolescents Aged 12–17 Years — United States, December 14, 2020–July 16, 2021.** Hause AM, et al. *MMWR Morb Mortal Wkly Rep.* ePub: 30 July 2021. DOI: <http://dx.doi.org/10.15585/mmwr.mm7031e1>

In preauthorization trials of the Pfizer-BioNTech COVID-19 vaccine, adolescents aged 12–17 years reported local and systemic mild and moderate reactions. Myocarditis has been observed after vaccination with mRNA vaccines in postauthorization monitoring. Local and systemic reactions after vaccination with Pfizer-BioNTech vaccine were commonly reported by adolescents aged 12–17 years to U.S. vaccine safety monitoring systems, especially after dose 2. A small proportion of these reactions are consistent with myocarditis. Mild local and systemic reactions are common among adolescents following Pfizer-BioNTech vaccine, and serious adverse events are rare. The Advisory Committee on Immunization Practices conducted a risk-benefit assessment and continues to recommend the Pfizer-BioNTech COVID-19 vaccine for all persons aged ≥ 12 years.

- 14. Neutralizing antibodies against SARS-CoV-2 variants induced by natural infection or vaccination: a systematic review and pooled meta-analysis.** Chen X, et al. *Clin Infect Dis.* 2021 Jul 24:ciab646. doi: 10.1093/cid/ciab646. <https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab646/6327511>

Neutralizing antibodies levels induced by mRNA vaccines against SARS-CoV-2 variants were similar, or higher, than that derived from naturally-infected individuals.

- 15. Antibody Response after a Third Dose of the mRNA-1273 SARS-CoV-2 Vaccine in Kidney Transplant Recipients with Minimal Serologic Response to 2 Doses.** Benotmane I, et al. *JAMA.* 2021 Jul 23. doi: 10.1001/jama.2021.12339. <https://jamanetwork.com/journals/jama/fullarticle/2782538>

This study found that a third dose of mRNA-1273 vaccine induced a serologic response in 49% of kidney transplant recipients who did not respond after 2 doses. The findings in this large group of kidney transplant recipients are in accordance with other studies of solid organ transplant recipients. However, 51% of the patients did not develop anti-SARS-CoV-2 antibodies after the third dose, especially those receiving triple immunosuppression.

- 16. Sustained T cell immunity, protection and boosting using extended dosing intervals of BNT162b2 mRNA vaccine.** Payne RP et al. **PREPRINT.** https://www.pitch-study.org/PITCH_Dosing_Interval_23072021.pdf

Extension of the interval between vaccine doses for the BNT162b2 mRNA vaccine was introduced in the UK to accelerate population coverage with a single dose. In a study of 503 healthcare workers, we show that after priming following the first vaccine there is a marked

decline in SARSCoV-2 neutralizing antibody (NAb) levels, but, in contrast, a sustained T cell response to spike protein. This divergent immune profile was accompanied by robust protection from infection over this period from the circulating alpha (B.1.1.7) variant. Importantly, following the second vaccine dose, NAb levels were higher after the extended dosing interval (6-14 weeks) compared to the conventional 3-4 week regimen, accompanied by a clear enrichment of CD4+ T cells expressing IL2. These data on dynamic cellular and humoral responses indicate that extension of the dosing interval is an effective, immunogenic protocol and that antiviral T cell responses are a potential mechanism of protection.

17. **Safety Evaluation of the Second Dose of Messenger RNA COVID-19 Vaccines in Patients with Immediate Reactions to the First Dose.** Krantz MS, et al. *JAMA Intern Med.* 2021 Jul 26. doi: 10.1001/jamainternmed.2021.3779.

<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2782348>

Although mild symptoms were reported in 20% of patients with second dose administration, all patients who received a second dose safely completed their vaccination series and could use mRNA COVID-19 vaccines in the future when indicated. Second dose tolerance following reactions to the first dose argues that either many of these initial reactions are not all truly allergic reactions, or supports an allergic, but non-immunoglobulin E-mediated mechanism in which symptoms can typically be abated with premedications.

18. **Safety and Immunogenicity of a DNA SARS-CoV-2 vaccine (ZyCoV-D): Results of an open-label, non-randomized phase I part of phase I/II clinical study by intradermal route in healthy subjects in India.** Momin T et al. *EClinicalMedicine.* 2021 Aug;38:101020. doi: 10.1016/j.eclinm.2021.101020. Epub 2021 Jul 17.

[https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(21\)00300-X/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(21)00300-X/fulltext)

ZyCoV-D vaccine is found to be safe, well-tolerated and immunogenic in the Phase 1 trial. Our findings suggest that the DNA vaccine warrants further investigation.

19. **Immunogenicity and reactogenicity of heterologous ChAdOx1 nCoV-19/mRNA vaccination.** Schmidt T et al. *Nat Med.* 2021 Jul 26. doi: 10.1038/s41591-021-01464-w.

<https://www.nature.com/articles/s41591-021-01464-w>

In this observational study we show that, in healthy adult individuals (n = 96), the heterologous vaccine regimen induced spike-specific IgG, neutralizing antibodies and spike-specific CD4 T cells, the levels of which were significantly higher than after homologous vector vaccine boost (n = 55) and higher or comparable in magnitude to homologous mRNA vaccine regimens (n = 62). Heterologous vector/mRNA boosting induces strong humoral and cellular immune responses with acceptable reactogenicity profiles.

20. **Six Month Safety and Efficacy of the BNT162b2 mRNA COVID-19 Vaccine.** Thomas SJ, et al. **medRxiv PREPRINT.** 2021.07.28.21261159; doi: <https://doi.org/10.1101/2021.07.28.21261159>
With up to 6 months of follow-up and despite a gradually declining trend in vaccine efficacy, BNT162b2 had a favorable safety profile and was highly efficacious in preventing COVID-19.

21. **Safety, tolerability, and immunogenicity of an aerosolised adenovirus type-5 vector-based COVID-19 vaccine (Ad5-nCoV) in adults: preliminary report of an open-label and randomised phase 1 clinical trial.** Wu S et al. *Lancet Infect Dis*. 2021 Jul 26:S1473-3099(21)00396-0. doi: 10.1016/S1473-3099(21)00396-0. [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(21\)00396-0/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00396-0/fulltext)

Aerosolised Ad5-nCoV is well tolerated, and two doses of aerosolised Ad5-nCoV elicited neutralising antibody responses, similar to one dose of intramuscular injection. An aerosolised booster vaccination at 28 days after first intramuscular injection induced strong IgG and neutralising antibody responses. The efficacy and cost-effectiveness of aerosol vaccination should be evaluated in future studies.

Whole Person Care

22. **Micro-Loss; Expanding Our Vocabulary to Describe Grief during the Time of Covid.** McLaughlin, Danielle. [Providence author]. *J Soc Work End Life Palliat Care*. 2021 Jul 20:1-3. doi: 10.1080/15524256.2021.1950101. <https://www.tandfonline.com/doi/abs/10.1080/15524256.2021.1950101>

The term “micro-loss” was born from a need for a more nuanced vocabulary to describe grief, as grief itself has variations.

Women & Children

23. **SARS-COV-2 infection during pregnancy and risk of preeclampsia: a systematic review and meta-analysis.** Conde-Agudelo A, et al. *Am J Obstet Gynecol*. 2021 Jul 21:S0002-9378(21)00795-X. doi: 10.1016/j.ajog.2021.07.009. [https://www.ajog.org/article/S0002-9378\(21\)00795-X/fulltext](https://www.ajog.org/article/S0002-9378(21)00795-X/fulltext)

Twenty-eight studies that included 790,954 pregnant women, among which 15,524 were diagnosed with SARS-CoV-2 infection, met the inclusion criteria. The meta-analysis of unadjusted ORs showed that the odds of developing preeclampsia were significantly higher among pregnant women with SARS-CoV-2 infection than among those without SARS-CoV-2 infection, 7.0% vs 4.8%. Both asymptomatic and symptomatic SARS-CoV-2 infections significantly increased the odds of preeclampsia although it was higher among patients with symptomatic illness than among those with asymptomatic illness. CONCLUSIONS: SARS-CoV-2 during pregnancy is associated with higher odds of preeclampsia.

24. **Six month follow-up of patients with multisystem inflammatory syndrome in children.** Capone CA, et al. *Pediatrics*. 2021; doi: 10.1542/peds.2021-050973 <https://pediatrics.aappublications.org/content/pediatrics/early/2021/07/28/peds.2021-050973.full.pdf>

Children with MIS-C treated with immunomodulators have favorable early outcomes with no mortality, normalization of LV systolic function, recovery of coronary abnormalities, and no inflammation or scarring on CMRI. Persistence of diastolic dysfunction is of uncertain significance and indicates need for larger studies to improve understanding of MIS-C. These

findings may help guide clinical management, outpatient monitoring, and considerations for sports clearance.

25. **SARS-CoV-2 Antibodies Detected in Mother's Milk Post-Vaccination.** Baird JK, Jensen SM, Urba WJ, Fox BA, Baird JR. [Providence authors]. *J Hum Lact.* 2021 Jul 23:8903344211030168. doi: 10.1177/08903344211030168.

<https://journals.sagepub.com/doi/pdf/10.1177/08903344211030168>

We observed significantly elevated levels of SARS-CoV-2 specific IgG and IgA antibodies in human milk beginning approximately 7 days after the initial vaccine dose, with an IgG-dominant response.

GUIDELINES & CONSENSUS STATEMENTS

[Joint Statement in Support of COVID-19 Vaccine Mandates for All Workers in Health and Long-Term Care](#)

FDA / CDC / NIH / WHO Updates

CDC - [Mask guidance for vaccinated persons](#), updated July 27, 2021.

CDC - [Interim Public Health Recommendations for Fully Vaccinated People](#), updated July 28, 2021. Added a recommendation for fully vaccinated people who have a known exposure to someone with suspected or confirmed COVID-19 to be tested 3-5 days after exposure.

Commentary & News

[Nine Lessons Learned From the COVID-19 Pandemic for Improving Hospital Care and Health Care Delivery.](#) Wei EK, et al. *JAMA Intern Med.* 2021 Jul 23. doi: 10.1001/jamainternmed.2021.4237.

Washington Post: [‘The war has changed’: Internal CDC document urges new messaging, warns delta infections likely more severe](#)

See also: [Internal CDC document on breakthrough infections](#)

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