Providence

# 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

### Clinical Syndrome

1. **Delirium and COVID-19: a narrative review of emerging evidence.** White L, Jackson T. *Anaesthesia.* 2022 Jan;77 Suppl 1:49-58. doi: 10.1111/anae.15627. https://associationofanaesthetists-publications.onlinelibrary.wiley.com/doi/10.1111/anae.15627
Delirium is a common condition affecting hospital inpatients, including those having surgery and on the intensive care unit. Delirium is also common in patients with COVID-19 in hospital settings, and the occurrence is higher than expected for similar infections. The short-term outcomes of those with COVID-19 delirium are similar to that of classical delirium and include increased length of stay and increased mortality. Management of delirium in COVID-19 in the context of a global pandemic is limited by the severity of the syndrome and compounded by the environmental constraints. Practical management includes effective screening, early identification and appropriate treatment aimed at minimising complications and timely escalation decisions. The pandemic has played out on the national stage and the effect of delirium on patients, relatives and healthcare workers remains unknown but evidence from the previous SARS outbreak suggests there may be long-lasting psychological damage.

2. **Specific nutritional and metabolic characteristics of COVID-19 persistent critically ill patients.** Viana MV, et al. *JPEN J Parenter Enteral Nutr*. 2022 Jan 19. doi: 10.1002/jpen.2334. https://aspenjournals.onlinelibrary.wiley.com/doi/10.1002/jpen.2334
Compared to non-CO, COVID patients were not more obese, had lower SOFA scores, and were fed more rapidly with EN, due to a more normal gastrointestinal function possibly due to lower non-respiratory organ failures: their energy balances were more negative after the first 10 days. Propofol sedation reduced protein delivery.

### Diagnostics & Screening

3. **Diagnostic accuracy of rapid point-of-care tests for diagnosis of current SARS-CoV-2 infections in children: a systematic review and meta-analysis.** Fujita-Rohwerder N, et al. *BMJ Evid Based Med.* 2022 Jan 18;bmjebm-2021-111828. doi: 10.1136/bmjebm-2021-111828. https://ebm.bmj.com/content/early/2022/01/04/bmjebm-2021-111828

17 studies with a total of 6355 paediatric study participants were included. All studies compared antigen tests against RT-PCR. Overall, studies evaluated eight antigen tests from six different brands. Only one study was at low risk of bias. The pooled overall diagnostic sensitivity and specificity in paediatric populations was 64.2% and 99.1%, respectively. In symptomatic children, the pooled diagnostic sensitivity was 71.8% and the pooled diagnostic specificity was 98.7%. The pooled diagnostic sensitivity in asymptomatic children was 56.2% and the pooled diagnostic specificity was 98.6%. The performance of current antigen tests in paediatric populations under real-life conditions varies broadly. Relevant data were only identified for very few antigen tests on the market, and the risk of bias was mostly unclear due to poor reporting. Additionally, the most common uses of these tests in children (eg, self-testing in schools or parents testing their toddlers before kindergarten) have not been addressed in clinical performance studies yet. The observed low diagnostic sensitivity may impact the planned purpose of the broad implementation of testing programmes.

## Epidemiology & Public Health

4. **Estimating COVID-19 Infections, Hospitalizations, and Deaths Following the US Vaccination Campaigns During the Pandemic.** Vilches TN, et al. *JAMA Netw Open.* 2022 Jan 4;5(1):e2142725. doi: 10.1001/jamanetworkopen.2021.42725.
https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2787935
Our analytical model suggested that the US COVID-19 vaccination program was associated with a reduction in the total hospitalizations and deaths by nearly half during the first 6 months of 2021. It was also associated with decreased impact of the more transmissible and lethal Alpha variant that was circulating during the same period. As new variants of SARS-CoV-2 continue to emerge, a renewed commitment to vaccine access, particularly among underserved groups and in counties with low vaccination coverage, will be crucial to preventing avoidable COVID-19 cases and bringing the pandemic to a close.

5. **Racial and Ethnic Disparities in Receipt of Medications for Treatment of COVID-19 - United States, March 2020-August 2021.** Wiltz JL et al. *MMWR Morb Mortal Wkly Rep.* 2022 Jan 21;71(3):96-102. doi: 10.15585/mmwr.mm7103e1.
https://www.cdc.gov/mmwr/volumes/71/wr/mm7103e1.htm
Among all patients with positive SARS-CoV-2 test results, the overall use of mAb was infrequent, with mean monthly use at 4% or less for all racial and ethnic groups. Hispanic patients received mAb 58% less often than did non-Hispanic patients, and Black, Asian, or Other race patients received mAb 22%, 48%, and 47% less often, respectively, than did White patients during November 2020-August 2021. Among inpatients, disparities were different and of lesser magnitude: Hispanic inpatients received dexamethasone 6% less often than did non-Hispanic inpatients, and Black inpatients received remdesivir 9% more often than did White inpatients. Vaccines and preventive measures are the best defense against infection; use of COVID-19 medications postexposure or postinfection can reduce morbidity and mortality and relieve strain on hospitals but are not a substitute for COVID-19 vaccination. Public health policies and programs centered around the specific needs of communities can promote health equity. Equitable receipt of outpatient treatments, such as mAb and antiviral medications, and

implementation of prevention practices are essential to reducing existing racial and ethnic inequities in severe COVID-19-associated illness and death.

6. **COVID-19 Incidence and Death Rates among Unvaccinated and Fully Vaccinated Adults with and Without Booster Doses during Periods of Delta and Omicron Variant Emergence — 25 U.S. Jurisdictions, April 4–December 25, 2021.** Johnson AG, Amin AB, Ali AR, et al. *MMWR Morb Mortal Wkly Rep*. ePub: 21 January 2022. DOI: http://dx.doi.org/10.15585/mmwr.mm7104e2
   During 2021, averaged weekly, age-standardized case IRRs among unvaccinated persons compared with fully vaccinated persons decreased from 13.9 pre-Delta to 8.7 as Delta emerged, and to 5.1 during the period of Delta predominance. During October–November, unvaccinated persons had 13.9 and 53.2 times the risks for infection and COVID-19–associated death, respectively, compared with fully vaccinated persons who received booster doses, and 4.0 and 12.7 times the risks compared with fully vaccinated persons without booster doses. When the Omicron variant emerged during December 2021, case IRRs decreased to 4.9 for fully vaccinated persons with booster doses and 2.8 for those without booster doses, relative to October–November 2021. The highest impact of booster doses against infection and death compared with full vaccination without booster doses was recorded among persons aged 50–64 and ≥65 years. Eligible persons should stay up to date with COVID-19 vaccinations.

7. **COVID-19 Cases and Hospitalizations by COVID-19 Vaccination Status and Previous COVID-19 Diagnosis — California and New York, May–November 2021.** León TM, et al. *MMWR Morb Mortal Wkly Rep*. ePub: 19 January 2022. DOI: http://dx.doi.org/10.15585/mmwr.mm7104e1
   Although the epidemiology of COVID-19 might change as new variants emerge, vaccination remains the safest strategy for averting future SARS-CoV-2 infections, hospitalizations, long-term sequelae, and death. Primary vaccination, additional doses, and booster doses are recommended for all eligible persons. Additional future recommendations for vaccine doses might be warranted as the virus and immunity levels change.

### Prognosis

8. **Risk of serious COVID-19 outcomes among adults with asthma in Scotland: a national incident cohort study.** Public Health Scotland and the EAVE II Collaborators. *Lancet Respir Med*. 2022 Jan 13:S2213-2600(21)00543-9. doi: 10.1016/S2213-2600(21)00543-9.
   https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(21)00543-9/fulltext
   Adults with asthma who have required two or more courses of oral corticosteroids in the previous 2 years or a hospital admission for asthma before March 1, 2020, are at increased risk of both COVID-19 hospitalisation and ICU admission or death. Patients with a recent asthma attack should be considered a priority group for booster COVID-19 vaccines.

## Survivorship & Rehabilitation

9. **Multi-organ assessment in mainly non-hospitalized individuals after SARS-CoV-2 infection: The Hamburg City Health Study COVID programme.** Petersen EL, et al. *Eur Heart J.* 2022 Jan 6;ehab914. doi: 10.1093/eurheartj/ehab914. https://academic.oup.com/eurheartj/advance-article/doi/10.1093/eurheartj/ehab914/6499078
   Four hundred and forty-three mainly non-hospitalized individuals were examined in median 9.6 months after the first positive SARS-CoV-2 test and matched for age, sex, and education with 1328 controls from a population-based German cohort. We assessed pulmonary, cardiac, vascular, renal, and neurological status, as well as patient-related outcomes. Cardiac assessment revealed slightly lower measures of left and right ventricular function and higher concentrations of cardiac biomarkers in post-SARS-CoV-2 patients compared with matched controls. Subjects who apparently recovered from mild to moderate SARS-CoV-2 infection show signs of subclinical multi-organ affection related to pulmonary, cardiac, thrombotic, and renal function without signs of structural brain damage, neurocognitive, or quality-of-life impairment. Respective screening may guide further patient management.

## Therapeutics

10. **Effect of Subcutaneous Casirivimab and Imdevimab Antibody Combination vs Placebo on Development of Symptomatic COVID-19 in Early Asymptomatic SARS-CoV-2 Infection: A Randomized Clinical Trial.** O'Brien MP et al. *JAMA.* 2022 Jan 14. doi: 10.1001/jama.2021.24939. https://jamanetwork.com/journals/jama/fullarticle/2788256
    Among asymptomatic SARS-CoV-2 RT-qPCR-positive individuals living with an infected household contact, treatment with subcutaneous casirivimab and imdevimab antibody combination vs placebo significantly reduced the incidence of symptomatic COVID-19 over 28 days.

11. **Effect of P2Y12 Inhibitors on Survival Free of Organ Support Among Non-Critically Ill Hospitalized Patients With COVID-19: A Randomized Clinical Trial.** Berger JS et al. *JAMA.* 2022 Jan 18;327(3):227-236. doi: 10.1001/jama.2021.23605. https://jamanetwork.com/journals/jama/fullarticle/2788141
    Among non-critically ill patients hospitalized for COVID-19, the use of a P2Y12 inhibitor in addition to a therapeutic dose of heparin, compared with a therapeutic dose of heparin only, did not result in an increased odds of improvement in organ support-free days within 21 days during hospitalization.

12. **An infectious SARS-CoV-2 B.1.1.529 Omicron virus escapes neutralization by therapeutic monoclonal antibodies.** VanBlargan LA et al. *Nat Med.* 2022 Jan 19:1-6. doi: 10.1038/s41591-021-01678-y. https://www.nature.com/articles/s41591-021-01678-y
    In this study, we tested a panel of anti-receptor-binding domain monoclonal antibodies (mAbs) corresponding to those in clinical use by Vir Biotechnology (S309, the parent mAb of VIR-7831 (sotrovimab)), AstraZeneca (COV2-2196 and COV2-2130, the parent mAbs of AZD8895 and AZD1061), Regeneron (REGN10933 and REGN10987), Eli Lilly (LY-CoV555 and LY-CoV016) and

Celltrion (CT-P59) for their ability to neutralize an infectious B.1.1.529 Omicron isolate. Several mAbs (LY-CoV555, LY-CoV016, REGN10933, REGN10987 and CT-P59) completely lost neutralizing activity against B.1.1.529 virus in both Vero-TMPRSS2 and Vero-hACE2-TMPRSS2 cells, whereas others were reduced (COV2-2196 and COV2-2130 combination, ~12-fold decrease) or minimally affected (S309). Our results suggest that several, but not all, of the antibodies in clinical use might lose efficacy against the B.1.1.529 Omicron variant.

13. **Remdesivir for the treatment of patients in hospital with COVID-19 in Canada: a randomized controlled trial.** Ali K et al. *CMAJ.* 2022 Jan 19:cmaj.211698. doi: 10.1503/cmaj.211698. https://www.cmaj.ca/content/early/2022/01/19/cmaj.211698
Remdesivir, when compared with standard of care, has a modest but significant effect on outcomes important to patients and health systems, such as the need for mechanical ventilation.

### Vaccines / Immunology

14. **Case Series of Thrombosis with Thrombocytopenia Syndrome after COVID-19 Vaccination-United States, December 2020 to August 2021.** See I et al. *Ann Intern Med.* 2022 Jan 18. doi: 10.7326/M21-4502. https://www.acpjournals.org/doi/10.7326/M21-4502
A total of 57 TTS cases were confirmed after vaccination with Ad26.COV2.S (n = 54) or a messenger RNA (mRNA)-based COVID-19 vaccine (n = 3). Reporting rates for TTS were 3.83 per million vaccine doses (Ad26.COV2.S) and 0.00855 per million vaccine doses (mRNA-based COVID-19 vaccines). The median age of patients with TTS after Ad26.COV2.S vaccination was 44.5 years and 69% of patients were women. All cases after Ad26.COV2.S vaccination involved hospitalization, including 36 (67%) with intensive care unit admission. Outcomes of hospitalizations after Ad26.COV2.S vaccination included death (15%), discharge to postacute care (17%), and discharge home (68%). Thrombosis with thrombocytopenia syndrome is a rare but serious adverse event associated with Ad26.COV2.S vaccination. The different demographic characteristics of the 3 cases reported after mRNA-based COVID-19 vaccines and the much lower reporting rate suggest that these cases represent a background rate.

15. **Homologous or Heterologous Booster of Inactivated Vaccine Reduces SARS-CoV-2 Omicron Variant Escape from Neutralizing Antibodies.** Wang X et al. *Emerg Microbes Infect.* 2022 Jan 15:1-18. doi: 10.1080/22221751.2022.2030200.
https://www.tandfonline.com/doi/full/10.1080/22221751.2022.2030200
The massive and rapid transmission of SARS-CoV-2 has led to the emergence of several viral variants of concern (VOCs), with the most recent one, B.1.1.529 (Omicron), which accumulated a large number of spike mutations, raising the specter that this newly identified variant may escape from the currently available vaccines and therapeutic antibodies. Using VSV-based pseudovirus, we found that Omicron variant is markedly resistant to neutralization of sera from convalescents or individuals vaccinated by two doses of inactivated whole-virion vaccines (BBIBP-CorV). However, a homologous inactivated vaccine booster or a heterologous booster with protein subunit vaccine (ZF2001) significantly increased neutralization titers to both WT and Omicron variant. Moreover, at day 14 post the third dose, neutralizing antibody titer

reduction for Omicron was less than that for convalescents or individuals who had only two doses of the vaccine, indicating that a homologous or heterologous booster can reduce the Omicron escape from neutralizing. In addition, we tested a panel of 17 SARS-CoV-2 monoclonal antibodies (mAbs). Omicron resists 7 of 8 authorized/approved mAbs, as well as most of the other mAbs targeting distinct epitopes on RBD and NTD. Taken together, our results suggest the urgency to push forward the booster vaccination to combat the emerging SARS-CoV-2 variants.

16. **Safety and immunogenicity of a third-dose homologous BBIBP-CorV boosting vaccination: interim results from a prospective open-label study.** Ai J et al. *Emerg Microbes Infect*. 2022 Jan 17:1-36. doi: 10.1080/22221751.2022.2025746.
https://www.tandfonline.com/doi/full/10.1080/22221751.2022.2025746
We conducted this prospective, open-label study in Huashan Hospital using a third 6.5U BBIBP-CorV administered at an interval of 4 to 8 months following previous two doses in healthy adults. Safety, anti-RBD response and neutralizing titers against SARS-CoV-2 and VOCs were examined. Sixty-three and forty participants entered booster and control group respectively. A significant increase in IFN-γ SFU per million PBMCs was observed on day 14 against N peptide (20 vs 5, P＜0.001). At day 14, pVNT GMTs increased over 15 folds of the baseline levels against prototype to reach 404.54 titer and over 9-13 folds against 4 VOCs, and continuously increased by day 28. sVNT GMTs increased 112.51 and 127.45 folds by day 14 and 28 compared to baseline level. Median anti-RBD antibody and IgG level significantly increased from 11.12 BAU/ml to 2607.50 BAU/ml and 4.07 BAU/ml to 619.20 BAU/ml on day 14. At Day 14, female showed a significantly higher cell-mediated immune response against S1 peptide, and 7-8 months interval group had a higher humoral response than 4-6 months interval group. No severe adverse event was reported. A third homologous BBIBP-CorV boosting vaccination was safe and highly immunogenic for healthy adults, as well as broadened participant's immunity against VOCs. Trial registration: ClinicalTrials.gov identifier: NCT05095298.

17. **Neutralization of SARS-CoV-2 Omicron by BNT162b2 mRNA vaccine–elicited human sera.** Muik A et al. *Science.* 2022 Jan 18. DOI: 10.1126/science.abn7591
https://www.science.org/doi/10.1126/science.abn7591
Omicron (B.1.1.529) has a large number of mutations especially in the spike protein, indicating that recognition by neutralizing antibodies may be compromised. We tested Wuhan, Beta, Delta, or Omicron pseudoviruses with sera of 51 participants that received two or three doses of the mRNA-based COVID-19 vaccine BNT162b2. Following two doses, sera had >22-fold reduced neutralizing titers against Omicron compared to Wuhan pseudovirus. One month after the third vaccine dose, Omicron-neutralizing titers were increased 23-fold compared to two doses, with titers similar to Wuhan-neutralizing titers after two doses. The requirement of a third vaccine dose to effectively neutralize Omicron was confirmed using live SARS-CoV-2 in a subset of participants. These data suggest that three doses of the mRNA vaccine BNT162b2 may protect against Omicron-mediated COVID-19.

18. **Effectiveness of COVID-19 booster vaccines against covid-19 related symptoms, hospitalisation and death in England.** Andrews N, et al. *Nat Med.* 2022 Jan 14. doi:

10.1038/s41591-022-01699-1. https://www.nature.com/articles/s41591-022-01699-1_reference.pdf
Booster vaccination with mRNA vaccines have been offered to adults in England starting on 14 September 2021. The relative effectiveness against symptomatic disease 14-34 days after a BNT162b2 or mRNA-1273 (Moderna) booster after a ChAdOx1-S (Astrazeneca) and BNT162b2 as a primary course ranged from around 85 to 95%. Absolute VE ranged from 94-97% and was similar in all age groups. Limited waning was seen 10+ weeks after the booster. Against hospitalisation or death absolute effectiveness of a BNT162b2 booster ranged from around 97% to 99% in all age groups irrespective of the primary course with no evidence of waning up to 10 weeks. This study provides real world evidence of significant increased protection from the booster vaccine dose against mild and severe disease irrespective of the primary course.

19. **Immunogenicity and Reactogenicity of Vaccine Boosters after Ad26.COV2.S Priming.** Sablerolles RSG et al. *N Engl J Med.* 2022 Jan 19. doi: 10.1056/NEJMoa2116747. https://www.nejm.org/doi/full/10.1056/NEJMoa2116747
The Ad26.COV2.S and mRNA boosters had an acceptable safety profile and were immunogenic in health care workers who had received a priming dose of Ad26.COV2.S vaccine. The strongest responses occurred after boosting with mRNA-based vaccines. Boosting with any available vaccine was better than not boosting.

20. **Neutralizing antibodies against the SARS-CoV-2 Delta and Omicron variants following heterologous CoronaVac plus BNT162b2 booster vaccination.** Pérez-Then E et al. *Nat Med.* 2022 Jan 20. doi: 10.1038/s41591-022-01705-6. https://www.nature.com/articles/s41591-022-01705-6
Here, we evaluated the effects of a heterologous BNT162b2 mRNA vaccine booster on the humoral immunity of participants that had received a two-dose regimen of CoronaVac, an inactivated vaccine used globally. We found that heterologous CoronaVac prime followed by BNT162b2 booster regimen induces elevated virus-specific antibody levels and potent neutralization activity against the ancestral virus and Delta variant, resembling the titers obtained after two-doses of mRNA vaccines. While neutralization of Omicron was undetectable in participants that had received a two-dose regimen of CoronaVac vaccine, BNT162b2 booster resulted in a 1.4-fold increase in neutralization activity against Omicron, compared to two-dose mRNA vaccine. Despite this increase, neutralizing antibody titers were reduced by 7.1-fold and 3.6-fold for Omicron compared to ancestral and Delta variant, respectively. Our findings have immediate implications for multiples countries that previously used a CoronaVac regimen and reinforce the notion that the Omicron variant is associated with immune escape from vaccines or infection-induced immunity, highlighting the global need for vaccine boosters to combat the impact of emerging variants.

21. **Neutralizing antibodies against the SARS-CoV-2 Omicron variant following homologous and heterologous CoronaVac or BNT162b2 vaccination.** Cheng SMS et al. *Nat Med.* 2022 Jan 20. doi: 10.1038/s41591-022-01704-7. https://www.nature.com/articles/s41591-022-01704-7
We have previously established that a 50% plaque reduction neutralization (PRNT50) antibody titre ≥25.6 in our live virus assay corresponded to the threshold for 50% protection from

infection against wild-type (WT) SARS-CoV-2. Here we show markedly reduced serum antibody titres against the Omicron variant (geometric mean titre (GMT) <10) as compared to wild-type virus 3-5 weeks after two doses of BNT162b2 (GMT 218.8) or CoronaVac vaccines (GMT 32.5). A BNT162b2 booster dose elicited Omicron PRNT50 titres ≥25.6 in 88% of individuals (22 of 25) who previously received 2 doses of BNT162b2 and 80% of individuals (24 of 30) who previously received CoronaVac. However, few (3%) previously infected individuals (1 of 30) or those vaccinated with three doses of CoronaVac (1 of 30) met this threshold. Our findings suggest that countries primarily using CoronaVac vaccines should consider mRNA vaccine boosters in response to the spread of Omicron. Studies evaluating the effectiveness of different vaccines against the Omicron variant are urgently needed.

22. **Comparison of mRNA-1273 and BNT162b2 Vaccines on Breakthrough SARS-CoV-2 Infections, Hospitalizations, and Death during the Delta-Predominant Period.** Wang L, et al. *JAMA*. 2022 Jan 20. doi: 10.1001/jama.2022.0210.
https://jamanetwork.com/journals/jama/fullarticle/2788408
Immune responses to mRNA-1273 (Moderna) and BNT162b2 (Pfizer-BioNTech) vaccines decline by 6 months after vaccination,1 although antibody titers are higher with mRNA-1273.1,2 Comparison of vaccinated non-immunocompromised adults showed lower risk of hospitalization for recipients of mRNA-1273 than BNT162b2 during March-August 2021.3 This study examined breakthrough infections, hospitalizations, and mortality in a general population for these 2 vaccines during the Delta period while considering risk characteristics of vaccine recipients and the varying time since vaccination.

23. **mRNA booster immunization elicits potent neutralizing serum activity against the SARS-CoV-2 Omicron variant.** Gruell H et al. *Nat Med.* 2022 Jan 19:1-4. doi: 10.1038/s41591-021-01676-0.
https://www.nature.com/articles/s41591-021-01676-0
We report a near-complete lack of neutralizing activity against Omicron in polyclonal sera from individuals vaccinated with two doses of the BNT162b2 COVID-19 vaccine and from convalescent individuals, as well as resistance to different monoclonal antibodies in clinical use. However, mRNA booster immunizations in vaccinated and convalescent individuals resulted in a significant increase of serum neutralizing activity against Omicron. This study demonstrates that booster immunizations can critically improve the humoral immune response against the Omicron variant.

24. **Effectiveness of a Third Dose of mRNA Vaccines against COVID-19–Associated Emergency Department and Urgent Care Encounters and Hospitalizations Among Adults During Periods of Delta and Omicron Variant Predominance — VISION Network, 10 States, August 2021–January 2022.** Thompson MG, Natarajan K, Irving SA, et al. *MMWR Morb Mortal Wkly Rep*. ePub: 21 January 2022. DOI: http://dx.doi.org/10.15585/mmwr.mm7104e3
The highest estimates of VE against COVID-19–associated ED and UC encounters or hospitalizations during both Delta- and Omicron-predominant periods were among adults who received a third dose of mRNA vaccine. All unvaccinated persons should get vaccinated as soon as possible. All adults who have received mRNA vaccines during their primary COVID-19

vaccination series should receive a third dose when eligible, and eligible persons should stay up to date with COVID-19 vaccinations.

### Women & Children

25. **Longitudinal Assessment of Cardiac Outcomes of Multisystem Inflammatory Syndrome in Children Associated With COVID-19 Infections.** Matsubara D et al. *J Am Heart Assoc.* 2022 Jan 19:e023251. doi: 10.1161/JAHA.121.023251.https://www.ahajournals.org/doi/10.1161/JAHA.121.023251
Our short-term study suggests that functional recovery and coronary outcomes are good in multisystem inflammatory syndrome in children. Use of sensitive deformation parameters provides further reassurance that there is no persistent subclinical dysfunction after 3 months.

26. **Healthcare use in 700 000 children and adolescents for six months after covid-19: before and after register based cohort study.** Magnusson K, et al. *BMJ.* 2022 Jan 17;376:e066809. doi: 10.1136/bmj-2021-066809. https://www.bmj.com/content/376/bmj-2021-066809
Covid-19 among children and adolescents was found to have limited impact on healthcare services in Norway. Preschool aged children might take longer to recover (3-6 months) than primary or secondary school students (1-3 months), usually because of respiratory conditions.

27. **Outcomes of SARS-CoV-2-Positive Youths Tested in Emergency Departments: The Global PERN-COVID-19 Study.** Funk AL et al. *JAMA Netw Open.* 2022 Jan 4;5(1):e2142322. doi: 10.1001/jamanetworkopen.2021.42322.
https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2787931
In this study, approximately 3% of SARS-CoV-2-positive youths tested in EDs experienced severe outcomes within 2 weeks of their ED visit. Among children discharged home from the ED, the risk was much lower. Risk factors such as age, underlying chronic illness, and symptom duration may be useful to consider when making clinical care decisions.

28. **No infectious SARS-CoV-2 in breast milk from a cohort of 110 lactating women.** Krogstad, P., et al. *Pediatr Res* (2022). https://doi.org/10.1038/s41390-021-01902-y
https://www.nature.com/articles/s41390-021-01902-y
Sixty-five women had a positive SARS-CoV-2 diagnostic test, 9 had symptoms but negative diagnostic tests, and 36 symptomatic women were not tested. SARS-CoV-2 vRNA was detected in the milk of 7 (6%) women with either a confirmed infection or symptomatic illness, including 6 of 65 (9%) women with a positive SARS-CoV-2 diagnostic test. Infectious virus was not detected in any culture and none had detectable sgRNA. In control experiments, infectious SARS-CoV-2 could be cultured after addition to breastmilk despite several freeze–thaw cycles, as it occurs in the storage and usage of human milk. SARS-CoV-2 RNA can be found infrequently in the breastmilk after recent infection, but we found no evidence that breastmilk contains an infectious virus or that breastfeeding represents a risk factor for transmission of infection to infants.

## GUIDELINES & CONSENSUS STATEMENTS

Current and novel biomarkers of thrombotic risk in COVID-19: a Consensus Statement from the International COVID-19 Thrombosis Biomarkers Colloquium. Gorog DA et al. *Nat Rev Cardiol.* 2022 Jan 13:1-21. doi: 10.1038/s41569-021-00665-7.

Update to living WHO guideline on drugs for covid-19. *BMJ*. 2022 Jan 13;376:o80. doi: 10.1136/bmj.o80.

Use of the Janssen (Johnson & Johnson) COVID-19 Vaccine: Updated Interim Recommendations from the Advisory Committee on Immunization Practices - United States, December 2021. Oliver SE et al. *MMWR Morb Mortal Wkly Rep.* 2022 Jan 21;71(3):90-95. doi: 10.15585/mmwr.mm7103a4.

## FDA / CDC / NIH / WHO Updates

CDC - Ending Isolation and Precautions for People with COVID-19: Interim Guidance. January 14, 2022

NIH - The COVID-19 Treatment Guidelines Panel's Statement on Therapies for High-Risk, Nonhospitalized Patients with Mild to Moderate COVID-19. January 19, 2022

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