

## COVID-19 Resource Desk

#13 | 7.15.2020 to 7.21.2020

Prepared by [System Library Services](#)

---

### New Research

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

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

**Retracted Articles - see also [Retraction Watch](#)**

1. **SARS-CoV-2 infects T lymphocytes through its spike protein-mediated membrane fusion.**  
Wang X, Xu W, Hu G, et al. *Cellular & Molecular Immunology* (2020), original article published on 07 April 2020. Retracted July 10, 2020.  
After the publication of this article, it came to the authors attention that in order to support the conclusions of the study, the authors should have used primary T cells instead of T-cell lines. In addition, there are concerns that the flow cytometry methodology applied here was flawed. These points resulted in the conclusions being considered invalid.

### Basic Science / Virology / Pre-clinical

2. **Humoral and circulating follicular helper T cell responses in recovered patients with COVID-19.** Juno JA, Tan HX, Lee WS, et al. *Nat Med.* 2020 Jul 13. doi: 10.1038/s41591-020-0995-0. <https://www.nature.com/articles/s41591-020-0995-0>  
Findings: In this study, we characterized humoral and circulating follicular helper T cell (cTFH) immunity against spike in recovered patients with coronavirus disease 2019 (COVID-19). We found that S-specific antibodies, memory B cells and cTFH are consistently elicited after SARS-CoV-2 infection, demarking robust humoral immunity and positively associated with plasma neutralizing activity. Comparatively low frequencies of B cells or cTFH specific for the receptor binding domain of S were elicited. Notably, the phenotype of S-specific cTFH differentiated subjects with potent neutralizing responses, providing a potential biomarker of potency for S-based vaccines entering the clinic. Overall, although patients who recovered from COVID-19 displayed multiple hallmarks of effective immune recognition of S, the wide spectrum of neutralizing activity observed suggests that vaccines might require strategies to selectively target the most potent neutralizing epitopes.
3. **SARS-CoV-2-specific T cell immunity in cases of COVID-19 and SARS, and uninfected controls.**  
Le Bert N, Tan AT, Kunasegaran K, et al. *Nature.* 2020 Jul 15. doi: 10.1038/s41586-020-2550-z. <https://www.nature.com/articles/s41586-020-2550-z>

Findings: Here, we first studied T cell responses to structural (nucleocapsid protein, NP) and non-structural (NSP-7 and NSP13 of ORF1) regions of SARS-CoV-2 in COVID-19 convalescents (n=36). In all of them we demonstrated the presence of CD4 and CD8 T cells recognizing multiple regions of the NP protein. We then showed that SARS-recovered patients (n=23) still possess long-lasting memory T cells reactive to SARS-NP 17 years after the 2003 outbreak, which displayed robust cross-reactivity to SARS-CoV-2 NP. Surprisingly, we also frequently detected SARS-CoV-2 specific T cells in individuals with no history of SARS, COVID-19 or contact with SARS/COVID-19 patients (n=37). SARS-CoV-2 T cells in uninfected donors exhibited a different pattern of immunodominance, frequently targeting the ORF-1-coded proteins NSP7 and 13 as well as the NP structural protein. Epitope characterization of NSP7-specific T cells showed recognition of protein fragments with low homology to "common cold" human coronaviruses but conserved amongst animal betacoronaviruses. Thus, infection with betacoronaviruses induces multispecific and long-lasting T cell immunity to the structural protein NP. Understanding how pre-existing NP- and ORF-1-specific T cells present in the general population impact susceptibility and pathogenesis of SARS-CoV-2 infection is of paramount importance for the management of the current COVID-19 pandemic.

4. **Potently neutralizing and protective human antibodies against SARS-CoV-2.** Zost SJ, Gilchuk P, et al. *Nature*. 2020 Jul 15. doi: 10.1038/s41586-020-2548-6.

<https://www.nature.com/articles/s41586-020-2548-6>

Findings: From a larger panel of human monoclonal antibodies (mAbs) targeting the spike (S) glycoprotein<sup>5</sup>, we identified several that exhibited potent neutralizing activity and fully blocked the receptor-binding domain of S (SRBD) from interacting with human ACE2 (hACE2). Competition-binding, structural, and functional studies allowed clustering of the mAbs into classes recognizing distinct epitopes on the SRBD as well as distinct conformational states of the S trimer. Potent neutralizing mAbs recognizing non-overlapping sites, COV2-2196 and COV2-2130, bound simultaneously to S and synergistically neutralized authentic SARS-CoV-2 virus. In two mouse models of SARS-CoV-2 infection, passive transfer of either COV2-2196 or COV2-2130 alone or a combination of both mAbs protected mice from weight loss and reduced viral burden and inflammation in the lung. In addition, passive transfer of each of two of the most potently ACE2 blocking mAbs (COV2-2196 or COV2-2381) as monotherapy protected rhesus macaques from SARS-CoV-2 infection. These results identify protective epitopes on SRBD and provide a structure-based framework for rational vaccine design and the selection of robust immunotherapeutics.

### Clinical Syndrome

5. **Thrombosis in Hospitalized Patients with COVID-19 in a New York City Health System.**

Bilaloglu S, Aphinyanaphongs Y, Jones S, et al. *JAMA*. July 20, 2020.

doi:10.1001/jama.2020.13372 <https://jamanetwork.com/journals/jama/fullarticle/2768715>

Findings: In patients with COVID-19 hospitalized in a large New York City health system, a thrombotic event occurred in 16.0%. D-dimer level at presentation was independently associated with thrombotic events, consistent with an early coagulopathy. Prior studies varied regarding the precise incidence of thrombosis; however, all suggested a heightened risk in

patients with COVID-19. This analysis found variation by clinical setting and type of thrombosis event. While thrombosis is observed in other acute infections (eg, 5.9% prevalence during the 2009 influenza pandemic), the thrombotic risk appears higher in COVID-19. Thrombosis in patients with COVID-19 may be due to a cytokine storm, hypoxic injury, endothelial dysfunction, hypercoagulability, and/or increased platelet activity.

6. **Pulmonary hypertension and right ventricular involvement in hospitalised patients with COVID-19.** Pagnesi M, Baldetti L, Beneduce A, et al. 2020 Jul 16. *Heart*. 2020;heartjnl-2020-317355. doi:10.1136/heartjnl-2020-317355  
<https://heart.bmj.com/content/early/2020/07/16/heartjnl-2020-317355.long>  
Findings: Among hospitalised non-ICU patients with COVID-19, PH (and not RVD) was associated with signs of more severe COVID-19 and with worse in-hospital clinical outcome.
7. **Retrospective Observational Study of Brain Magnetic Resonance Imaging Findings in Patients with Acute SARS-CoV-2 Infection and Neurological Manifestations.** Chougar L, Shor N, Weiss N, et al. 2020 Jul 17. *Radiology*. 2020;202422. doi:10.1148/radiol.2020202422  
<https://pubs.rsna.org/doi/10.1148/radiol.2020202422>  
Findings: During the inclusion period, 1176 consecutive patients were hospitalized for suspected COVID-19. Out of 308 patients with acute neurological symptoms, 73 patients met the inclusion criteria (23.7%) and were included: 35 ICU patients (47.9%) and 38 non-ICU patients (52.1%). The mean age was 58.5 ± 15.6 years, with a male predominance (65.8% vs. 34.2%). Forty-three patients presented pathological MRI findings 2-4 weeks after symptom onset (58.9%), including 17 with acute ischemic infarct (23.3%), 1 with a deep venous thrombosis (1.4%), 8 with multiple microhemorrhages (11.3%), 22 with perfusion abnormalities (47.7%), 3 with restricted diffusion foci within the corpus callosum consistent with cytotoxic lesions of the corpus callosum (CLOCC, 4.1%). Multifocal white matter enhancing lesions were seen in 4 ICU patients (5%). Basal ganglia abnormalities were seen in 4 other patients (5%). The cerebrospinal fluid (CSF) analysis was negative for SARS-CoV-2 in all tested patients (n=39). In addition to cerebrovascular lesions, perfusion abnormalities, CLOCC and ICU-related complications, we identified two patterns including white matter enhancing lesions and basal ganglia abnormalities that could be related to SARS-CoV-2 infection.
8. **Mortality rate of acute kidney injury in SARS, MERS, and COVID-19 infection: a systematic review and meta-analysis.** Chen YT, Shao SC, Lai EC, et al. *Crit Care*. 2020;24(1):439. 2020 Jul 16. doi:10.1186/s13054-020-03134-8  
<https://ccforum.biomedcentral.com/articles/10.1186/s13054-020-03134-8>  
Findings: Our analyses indicate AKI as a poor prognosis factor in coronavirus infections, whereby AKI mortality in COVID-19 is higher than MERS but lower than SARS infections. Possible mechanisms of higher AKI mortality following coronavirus infections are multifactorial (e.g., severe sepsis-related multi-organ failure, direct kidney involvement, and acute respiratory distress syndrome), although comparative pathogenesis of kidney involvement among the three infections remains unclear.

9. **Histopathology and ultrastructural findings of fatal COVID-19 infections in Washington State: a case series.** Bradley BT, Maioli H, Johnston R, et al. 2020 Jul 16. *Lancet.* 2020;S0140-6736(20)31305-2. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)31305-2/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31305-2/fulltext)

Findings: Post-mortem examinations were done on 14 people who died with COVID-19 at the King County Medical Examiner's Office and Snohomish County Medical Examiner's Office in negative-pressure isolation suites during February and March, 2020. The median age of our cohort was 73.5 years (range 42-84). All patients had clinically significant comorbidities, the most common being hypertension, chronic kidney disease, obstructive sleep apnoea, and metabolic disease including diabetes and obesity. The major pulmonary finding was diffuse alveolar damage in the acute or organising phases, with five patients showing focal pulmonary microthrombi. Coronavirus-like particles were detected in the respiratory system, kidney, and gastrointestinal tract. Lymphocytic myocarditis was observed in one patient with viral RNA detected in the tissue. The primary pathology observed in our cohort was diffuse alveolar damage, with virus located in the pneumocytes and tracheal epithelium. Microthrombi, where observed, were scarce and endotheliitis was not identified. Although other non-pulmonary organs showed susceptibility to infection, their contribution to the pathogenesis of SARS-CoV-2 infection requires further examination.

10. **Pulmonary Angiopathy in Severe COVID-19: Physiologic, Imaging and Hematologic**

**Observations.** Patel BV, Arachchilage DJ, Ridge CA, et al. *Am J Respir Crit Care Med.* 2020 Jul 15. doi: 10.1164/rccm.202004-1412OC.

<https://www.atsjournals.org/doi/10.1164/rccm.202004-1412OC>

Findings: In 39 consecutive patients (M:F 32:7; mean age, 53±10 years [range 29-79 years]; black and ethnic minority, n=25 [64%]), there was a significant vascular perfusion abnormality and increased physiologic dead-space (dynamic compliance, 33.7±14.7 ml/cmH<sub>2</sub>O; Murray Lung Injury Score, 3.14±0.53; mean ventilatory ratios, 2.6±0.8) with evidence of hypercoagulability and fibrinolytic 'shutdown'. The mean CT extent (±SD) of normally-aerated lung, ground-glass opacification and dense parenchymal opacification were 23.5±16.7%, 36.3±24.7% and 42.7±27.1%, respectively. Dilated peripheral vessels were present in 21/33 (63.6%) patients with at least two assessable lobes (including 10/21 [47.6%] with no evidence of acute pulmonary emboli). Perfusion defects on DECT (assessable in 18/20 [90%]), were present in all patients (wedge-shaped, n=3; mottled, n= 9; mixed pattern, n=6). Physiologic, hematologic and imaging data show not only the presence of a hypercoagulable phenotype in severe Covid-19 pneumonia but also markedly impaired pulmonary perfusion likely caused by pulmonary angiopathy and thrombosis.

11. **Characteristics of venous thromboembolism in COVID-19 patients: a multicenter experience from Northern Italy.** Marone EM, Bonalumi G, Curci R, et al. *Ann Vasc Surg.* 2020 Jul 13:S0890-5096(20)30598-7. doi:10.1016/j.avsg.2020.07.007.

[https://www.annalsofvascularsurgery.com/article/S0890-5096\(20\)30598-7/fulltext](https://www.annalsofvascularsurgery.com/article/S0890-5096(20)30598-7/fulltext)

Findings: Of 101 DUS performed, 42 were positive for DVT, 7 for superficial thrombophlebitis and 24 for PE, 8 of which associated with a DVT. Most had a moderate (43.9%) or mild (16.9%) pneumonia. All venous districts were involved. Time of onset varied greatly, but diagnosis was

more frequent in the first two weeks since in-hospital acceptance (73.8%). Most PEs involved the most distal pulmonary vessels, and two thirds occurred in absence of a recognizable deep vein thrombosis. DVT, thrombophlebitis and PE are different aspects of COVID-19 procoagulant activity and they can arise regardless of severity of respiratory impairment. All venous districts can be involved, including the pulmonary arteries, where the high number and distribution of the thrombotic lesions without signs of DVT could hint a primitive thrombosis rather than embolism.

12. **Symptom Profiles of a Convenience Sample of Patients with COVID-19 - United States, January-April 2020.** Burke RM, Killerby ME, et al. *MMWR Morb Mortal Wkly Rep.* 2020 Jul 17;69(28):904-908. doi: 10.15585/mmwr.mm6928a2.

[https://www.cdc.gov/mmwr/volumes/69/wr/mm6928a2.htm?s\\_cid=mm6928a2\\_x](https://www.cdc.gov/mmwr/volumes/69/wr/mm6928a2.htm?s_cid=mm6928a2_x)

Findings: To better understand symptom profiles of patients with laboratory-confirmed COVID-19 in the United States, CDC used an optional questionnaire to collect detailed information on a convenience sample of COVID-19 patients from participating states. Symptom data were analyzed by age group, sex, hospitalization status, and symptom onset date relative to expansion of testing guidelines on March 8, 2020 (3). Among 164 symptomatic patients with known onset during January 14-April 4, 2020, a total of 158 (96%) reported fever, cough, or shortness of breath. Among 57 hospitalized adult patients (aged  $\geq 18$  years), 39 (68%) reported all three of these symptoms, compared with 25 (31%) of the 81 non-hospitalized adult patients. Gastrointestinal (GI) symptoms and other symptoms, such as chills, myalgia, headache, and fatigue, also were commonly reported, especially after expansion of testing guidelines. To aid prompt recognition of COVID-19, clinicians and public health professionals should be aware that COVID-19 can cause a wide variety of symptoms.

13. **Severe immunosuppression and not a cytokine storm characterize COVID-19 infections.** Remy KE, Mazer M, Striker DA, et al. *JCI Insight.* 2020 Jul 20;140329. doi: 10.1172/jci.insight.140329.

<https://insight.jci.org/articles/view/140329>

Findings: COVID-19-associated morbidity and mortality have been attributed to a pathologic host response. Two divergent hypotheses have been proposed: a hyper-inflammatory 'cytokine-storm'-mediated injury versus failure of host protective immunity resulting in unrestrained viral dissemination and organ injury. A key explanation for the inability to address this controversy has been the lack of diagnostic tools to evaluate immune function in COVID-19 infections. ELISpot, a highly sensitive, functional immunoassay was employed in 27 COVID-19, 51 septic, 18 critically-ill non-septic (CINS), and 27 healthy controls to evaluate adaptive and innate immune status by quantitating T cell IFN- $\gamma$  and monocyte TFN- $\alpha$  production. Circulating T cell subsets were profoundly reduced in COVID-19 patients. Additionally, stimulated blood mononuclear cells produced less than 40% to 50% of the IFN- $\gamma$  and TNF- $\alpha$  observed in septic and CINS patients, consistent with markedly impaired immune effector cell function. Approximately 25% of COVID-19 patients had increased IL-6 levels greater than 1,000 pg/mL that were not associated with elevations in other canonical pro-inflammatory cytokines. Collectively, these findings support the hypothesis that COVID-19 suppresses host functional adaptive and innate immunity. Importantly, Interleukin-7 administered ex vivo restored T cell

IFN- $\gamma$  production in COVID-19 patients. Thus, ELISpot may functionally characterize host immunity in COVID-19 and inform prospective therapies.

### Diagnosics & Screening

- 14. Magnitude and kinetics of anti-SARS-CoV-2 antibody responses and their relationship to disease severity.** Lynch KL, Whitman JD, Lacanienta NP, et al. *Clin Infect Dis*. 2020 Jul 14:ciaa979. doi: 10.1093/cid/ciaa979.  
<https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa979/5871431>  
Findings: Patterns of SARS-CoV-2 antibody production varied considerably. Among 52 patients with 3 or more serial specimens, 44 (84.6%) and 42 (80.8%) had observed IgM and IgG seroconversion at a median of 8 and 10 days, respectively. Compared to those with milder disease, peak measurements were significantly higher for patients admitted to the intensive care unit for all time intervals between 6 and 20 days for IgM, and all intervals after 5 days for IgG. High sensitivity assays with a robust dynamic range provide a comprehensive picture of host antibody response to SARS-CoV-2. IgM and IgG responses were significantly higher in patients with severe than mild disease. These differences may affect strategies for seroprevalence studies, therapeutics and vaccine development.
- 15. Presymptomatic Transmission of SARS-CoV-2 amongst Residents and Staff at a Skilled Nursing Facility: Results of Real-Time PCR and Serologic Testing.** Goldberg SA, Lennerz J, Klompas M, et al. *Clin Infect Dis*. 2020 Jul 15:ciaa991. doi: 10.1093/cid/ciaa991.  
<https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa991/5871989>  
Findings: High rates of asymptomatic infection suggest benefits to routine testing in congregate care settings. SARS-CoV-2 screening was undertaken in a single nursing facility without a known case of COVID-19, demonstrating an 85% prevalence among residents and 37% among staff. Serology was not helpful in identifying infections.
- 16. Evaluation of six commercial mid to high volume antibody and six point of care lateral flow assays for detection of SARS-CoV-2 antibodies.** Charlton CL, Kanji JN, et al. *J Clin Microbiol*. 2020 Jul 14:JCM.01361-20. doi: 10.1128/JCM.01361-20.  
<https://jcm.asm.org/content/early/2020/07/10/JCM.01361-20>  
Findings: Six EIAs (Abbott, Affinity, BioRad, DiaSorin, Euroimmun, and Roche), and six POCTs (BTNX, Biolidics, Deep Blue, Genrui, Getein BioTech, and Innovita) were evaluated for the detection of SARS-CoV-2 antibodies in known COVID-19 infected individuals. Sensitivity of EIAs ranged from 50-100%, with only four assays having overall sensitivities >95% after 21 days post symptom onset. Notably, cross-reactivity with other respiratory viruses (PIV-4 (n=5), hMPV (n=3), rhinovirus/enterovirus (n=1), CoV-229E (n=2), CoV-NL63 (n=2), and CoV-OC43 (n=2) was observed; however, overall specificity for EIAs was good (92-100%; where all but one assay had specificity above 95%). POCTs were 0-100% sensitive >21 days post onset, with specificity ranging from 96-100%. However, many POCTs had faint banding and were often difficult to interpret. Conclusions: Serology assays can detect SARS-CoV-2 antibodies as early as 10 days post onset. Serology assays vary in their sensitivity based on the marker (IgA/M vs. IgG vs. total) and by manufacturer; however, overall only 4 EIA and 4 POCT assays had sensitivities >95% >21

days post symptom onset. Cross-reactivity with other seasonal coronaviruses is of concern. The use of serology assays should not be used for the diagnosis of acute infection, but rather for use in carefully designed serosurveys to facilitate understanding of seroprevalence in a population and to identify previous exposure to SARS-CoV-2.

## Epidemiology & Public Health

- 17. Factors Associated with Cloth Face Covering Use Among Adults During the COVID-19 Pandemic — United States, April and May 2020.** Fisher KA, Barile JP, Guerin RJ, et al. *MMWR Morb Mortal Wkly Rep.* ePub: 14 July 2020.  
[http://dx.doi.org/10.15585/mmwr.mm6928e3external icon](http://dx.doi.org/10.15585/mmwr.mm6928e3external_icon)  
Findings: An Internet survey sampled 503 adults during April 7–9 to assess their use of cloth face coverings and the behavioral and sociodemographic factors that might influence adherence to this recommendation. The same survey was administered 1 month later, during May 11–13, to another sample of 502 adults to assess changes in the prevalence estimates of use of cloth face coverings from April to May. Within days of the release of the first national recommendation for use of cloth face coverings, a majority of persons who reported leaving their home in the previous week reported using a cloth face covering (61.9%). Prevalence of use increased to 76.4% 1 month later, primarily associated with increases in use among non-Hispanic white persons (54.3% to 75.1%), persons aged ≥65 years (36.6% to 79.2%), and persons residing in the Midwest (43.7% to 73.8%). High rates were observed in April and by May, increased further among non-Hispanic black persons (74.4% to 82.3%), Hispanic or Latino persons (77.3% to 76.2%), non-Hispanic persons of other race (70.8% to 77.3%), persons aged 18–29 years (70.1% to 74.9%) and 30–39 years (73.9% to 84.4%), and persons residing in the Northeast (76.9% to 87.0%). The use of a cloth face covering was associated with theory-derived constructs that indicate a favorable attitude toward them, intention to use them, ability to use them, social support for using them, and beliefs that they offered protection for self, others, and the community. Research is needed to understand possible barriers to using cloth face coverings and ways to promote their consistent and correct use among those who have yet to adopt this behavior.
- 18. Characteristics of Persons Who Died with COVID-19 - United States, February 12-May 18, 2020.** Wortham JM, Lee JT, Althomsons S, Latash J, et al. *MMWR Morb Mortal Wkly Rep.* 2020 Jul 17;69(28):923-929. doi: 10.15585/mmwr.mm6928e1.  
<https://www.cdc.gov/mmwr/volumes/69/wr/mm6928e1.htm>  
Findings: During January 1, 2020-May 18, 2020, approximately 1.3 million cases of coronavirus disease 2019 (COVID-19) and 83,000 COVID-19-associated deaths were reported in the United States. Analysis of supplementary data for 10,647 decedents in 16 public health jurisdictions found that a majority were aged ≥65 years and most had underlying medical conditions. Overall, 34.9% of Hispanic and 29.5% of nonwhite decedents were aged <65 years, compared with 13.2% of white, non-Hispanic decedents. Among decedents aged <65 years, a total of 7.8% died in an emergency department or at home.

19. **Contact tracing during coronavirus disease outbreak, South Korea, 2020.** Park YJ, Choe YJ, Park O, et al. *Emerg Infect Dis.* 2020 Oct [Original Publication Date: July 16, 2020]. <https://doi.org/10.3201/eid2610.201315>  
Findings: We showed that household transmission of SARS-CoV-2 was high if the index patient was 10–19 years of age. The role of household transmission of SARS-CoV-2 amid reopening of schools and loosening of social distancing underscores the need for a time-sensitive epidemiologic study to guide public health policy. In the current mitigation strategy that includes physical distancing, optimizing the likelihood of reducing individual, family, and community disease is important.
20. **Seroprevalence of Antibodies to SARS-CoV-2 in 10 Sites in the United States, March 23-May 12, 2020.** Havers FP, Reed C, Lim T, et al. *JAMA Intern Med.* July 21, 2020. doi:10.1001/jamainternmed.2020.4130  
<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2768834?resultClick=1>  
Findings: In this cross-sectional study of 16 025 residual clinical specimens, estimates of the proportion of persons with detectable SARS-CoV-2 antibodies ranged from 1.0% in the San Francisco Bay area (collected April 23-27) to 6.9% of persons in New York City (collected March 23-April 1). Six to 24 times more infections were estimated per site with seroprevalence than with coronavirus disease 2019 (COVID-19) case report data.

### Healthcare Delivery & Healthcare Workers

21. **Safety of psychotropic medications in people with COVID-19: evidence review and practical recommendations.** Ostuzzi G, Papola D, et al. *BMC Med.* 2020 Jul 15;18(1):215. doi: 10.1186/s12916-020-01685-9. <https://bmcmmedicine.biomedcentral.com/articles/10.1186/s12916-020-01685-9>  
Findings: All classes of psychotropic medications showed potentially relevant safety risks for people with COVID-19. A set of practical recommendations was drawn in order to inform frontline clinicians on the assessment of the anticipated risk of psychotropic related unfavorable events, and the possible actions to take in order to effectively manage this risk, such as when it is appropriate to avoid, withdraw, switch, or adjust the dose of the medication. The present evidence-based recommendations will improve the quality of psychiatric care in people with COVID-19, allowing an appropriate management of the medical condition without worsening the psychiatric condition and vice versa.
22. **Impact of healthcare worker shift scheduling on workforce preservation during the COVID-19 pandemic.** Kluger DM, Aizenbud Y, Jaffe A, et al. *Infect Control Hosp Epidemiol.* 2020 Jul 20;1-15. doi: 10.1017/ice.2020.337. <https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/impact-of-healthcare-worker-shift-scheduling-on-workforce-preservation-during-the-covid19-pandemic/DC2C2BABB689AF001D78918A3A80AFD>  
Findings: We ran Monte Carlo simulations modeling the spread of SARS-CoV-2 in non-COVID wards, and found that longer nursing shifts and scheduling designs in which teams of nurses and doctors co-rotate no more frequently than every three days, can lead to fewer infections.

24. **The Impact of Hospital Bed Density on the COVID-19 Case Fatality Rate in the United States.** Bloom JA, Foroutanzaji S, Chatterjee A, et al. *Am Surg.* 2020 Jul 15;3134820939909. doi: 10.1177/0003134820939909. <https://journals.sagepub.com/doi/10.1177/0003134820939909>  
Findings: In this observational study, we performed a comparative analysis between the 2-month case fatality rate of the COVID-19 pandemic in the United States using the confirmed reported cases of COVID-19 infection in all 50 US states and the hospital bed density, according to the 2018 American Hospital Association annual hospital survey. At this current state of the COVID-19 pandemic, there is no statistically significant association between case fatality rate and hospital bed density in the United States after 3 months. The trend is somewhat stronger, but still statistically insignificant, in the regional data at the end of the third month compared with the second. This is thought to be secondary to the heroic efforts of many hospitals nationwide to rapidly expand the number of available hospital beds, intensive care unit beds, and ventilators. However, with the current trend in the available data, it is possible that with the growing incidence of COVID-19 in the United States, case fatality may become dependent upon available hospital beds and resources in the near future as seen in some European countries (eg, Italy and Spain). However, at this time, the number of active cases of COVID-19 requiring hospitalization and invasive respiratory support does not exceed available resources, and thus the variables remain independent.

### Prognosis

25. **Comparison of severity scores for COVID-19 patients with pneumonia: a retrospective study.** Fan G, Tu C, Zhou F, et al. 2020 Jul 16. *Eur Respir J.* 2020;2002113. doi:10.1183/13993003.02113-2020 <https://erj.ersjournals.com/content/early/2020/07/06/13993003.02113-2020.long>  
Findings: In this single center, retrospective study, all hospitalised patients with COVID-19 pneumonia from Wuhan Jin Yin-tan Hospital who had discharged or died as of February 15, 2020 were enrolled. Performance of PSI, CURB-65, A-DROP, CRB-65, SMART-COP, qSOFA and NEWS2 were validated. Net reclassification improvement (NRI) and integrated discrimination improvement (IDI) were also estimated. Among the 654 patients enrolled, 133 patients died and 521 were discharged. Areas of under curves (AUCs) of A-DROP, CURB-65, PSI, SMART-COP, NEWS2, CRB-65 and qSOFA in the prediction of in-hospital death were 0.87, 0.85, 0.85, 0.84, 0.81, 0.80 and 0.73 respectively. ADROP is a reliable tool for risk stratification of death in COVID-19 hospitalised patients on admission.
26. **The Palliative Performance Scale predicts mortality in hospitalized patients with COVID-19.** Fiorentino M, Pentakota SR, Mosenthal AC, Glass NE. 2020 Jul 17. *Palliat Med.* 2020;269216320940566. doi:10.1177/0269216320940566 <https://journals.sagepub.com/doi/full/10.1177/0269216320940566>  
Findings: Of 443 admitted patients, we determined the Palliative Performance Scale score for 374. Overall mortality was 31% and 81% in intubated patients. In all, 36% (134) of patients had a low Palliative Performance Scale score. Compared with patients with a high score, patients with a low score were more likely to die, have do not intubate orders and be discharged to a

facility. Palliative Performance Scale independently predicts mortality (odds ratio 2.89; 95% confidence interval 1.42–5.85). Preadmission Palliative Performance Scale independently predicts mortality in patients hospitalized with COVID-19. Improved predictors of mortality can help clinicians caring for patients with COVID-19 to discuss prognosis and provide appropriate palliative care including decisions about life-sustaining therapy.

27. **Development and validation of a risk factor-based system to predict short-term survival in adult hospitalized patients with COVID-19: a multicenter, retrospective, cohort study.** Zhang S, Guo M, Duan L, et al. *Crit Care*. 2020;24(1):438. 2020 Jul 16. doi:10.1186/s13054-020-03123-x <https://ccforum.biomedcentral.com/articles/10.1186/s13054-020-03123-x>

Findings: Older age, high lactate dehydrogenase level, evaluated neutrophil-to-lymphocyte ratio, and high direct bilirubin level were independent predictors of 28-day mortality in adult hospitalized patients with confirmed COVID-19. The nomogram system based on the four factors revealed good discrimination and calibration, suggesting good clinical utility.

28. **Comparing associations between frailty and mortality in hospitalised older adults with or without COVID-19 infection: a retrospective observational study using electronic health records.** Owen RK, Conroy SP, Taub N, et al. 2020 Jul 17. *Age Ageing*. 2020;afaa167. doi:10.1093/ageing/afaa167

<https://academic.oup.com/ageing/article/doi/10.1093/ageing/afaa167/5873137>

Findings: We analysed outcomes on 1,071 patients with COVID-19 test results; 285 (27%) were positive for COVID-19.)The mean age at ED arrival was 79.7 and 49.4% were female. All-cause mortality (by 30 days) rose from 9% (not frail) through to 33% (severely frail) in the COVID negative cohort but was around 60% for all frailty categories in the COVID positive cohort. In adjusted analyses, the hazard ratio for death in those with COVID-19 compared to those without COVID-19 was 7.3, 95% CI: 3.00, 18.0) with age, comorbidities and illness severity making small additional contributions. In this study frailty appeared to make little incremental contribution to the hazard of dying in older people hospitalised with COVID-19 infection; illness severity and comorbidity had a modest association with the overall adjusted hazard of death, whereas confirmed COVID-19 infection dominated, with a seven-fold hazard for death.

29. **High Thrombus Burden in Patients with COVID-19 Presenting with ST-Elevation Myocardial Infarction.** Choudry FA, Hamshere SM, Rathod KS, et al. 2020 Jul 10. *J Am Coll Cardiol*. 2020;S0735-1097(20)35966-0. doi:10.1016/j.jacc.2020.07.022

<https://www.onlinejacc.org/content/early/2020/07/07/j.jacc.2020.07.022>

Findings: STEMI patients presenting with concurrent COVID-19 infection had higher levels of Troponin T, lower lymphocyte count, but elevated D-dimer and C-reactive protein. There was significantly higher rates of multi-vessel thrombosis, stent thrombosis, higher modified thrombus grade post first device with consequently higher use of GP IIb/IIIa inhibitors and thrombus aspiration. Myocardial blush grade and left ventricular function were significantly lower in COVID patients with STEMI. Higher doses of heparin to achieve therapeutic ACTs were also noted. Importantly, STEMI patients presenting with COVID-19 infection had a longer in-patient admission and higher rates of intensive care admission. In patients presenting with STEMI and concurrent COVID-19 infection there is a strong signal towards higher thrombus

burden and poorer outcomes. This supports the need for establishing COVID status in all STEMI cases. Further work is required to understand the mechanism of increased thrombosis and the benefit of aggressive anti-thrombotic therapy in selected cases.

- 30. Factors Associated with Death in Critically Ill Patients with Coronavirus Disease 2019 in the US.** Gupta S, Hayek SS, Wang W, et al. *JAMA Intern Med.* July 15, 2020.  
doi:10.1001/jamainternmed.2020.3596  
<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2768602>  
Findings: In a cohort of 2215 adults with COVID-19 who were admitted to intensive care units at 65 sites, 784 (35.4%) died within 28 days, with wide variation among hospitals. Factors associated with death included older age, male sex, obesity, coronary artery disease, cancer, acute organ dysfunction, and admission to a hospital with fewer intensive care unit beds.
- 31. Risk Factors Associated With Mortality Among Patients With COVID-19 in Intensive Care Units in Lombardy, Italy.** Grasselli G, Greco M, Zanella A, et al; *JAMA Intern Med.* 2020 Jul 15. doi: 10.1001/jamainternmed.2020.3539.  
<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2768601>  
Findings: In this retrospective cohort study of critically ill patients admitted to ICUs in Lombardy, Italy, with laboratory-confirmed COVID-19, most patients required IMV. Hospital and ICU mortality rates were 12 (95% CI, 11-12) and 27 (95% CI, 26-29) per 1000 patients-days, respectively.
- 32. Nasopharyngeal SARS-CoV-2 load at hospital admission as predictor of mortality.** Alteri C, Cento V, Vecchi M, et al. *Clin Infect Dis.* 2020 Jul 16:ciaa956. doi: 10.1093/cid/ciaa956.  
<https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa956/5872588>  
Findings: Overall, we identified the high initial nasopharyngeal viral-load as an independent risk factor for in-hospital mortality, and for a significantly faster worsening of clinical conditions towards death. These results strengthen the recently reported correlation between viral-load and severe disease and provide initial evidence of a role for viral-load in influencing the definitive outcome.
- 33. Risk Factors for Intensive Care Unit Admission and In-hospital Mortality among Hospitalized Adults Identified through the U.S. Coronavirus Disease 2019 (COVID-19)-Associated Hospitalization Surveillance Network (COVID-NET).** Kim L, Garg S, O'Halloran A, Whitaker M, et al. *Clin Infect Dis.* 2020 Jul 16:ciaa1012. doi: 10.1093/cid/ciaa1012.  
<https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa1012/5872581>  
Findings: Ninety-two percent of patients had  $\geq 1$  underlying condition; 32% required ICU admission; 19% invasive mechanical ventilation; and 17% died. Independent factors associated with ICU admission included ages 50-64, 65-74, 75-84 and  $\geq 85$  years versus 18-39 years (adjusted risk ratio (aRR) 1.53, 1.65, 1.84 and 1.43, respectively); male sex (aRR 1.34); obesity (aRR 1.31); immunosuppression (aRR 1.29); and diabetes (aRR 1.13). Independent factors associated with in-hospital mortality included ages 50-64, 65-74, 75-84 and  $\geq 85$  years versus 18-39 years (aRR 3.11, 5.77, 7.67 and 10.98, respectively); male sex (aRR 1.30); immunosuppression (aRR 1.39); renal disease (aRR 1.33); chronic lung disease (aRR 1.31);

cardiovascular disease (aRR 1.28); neurologic disorders (aRR 1.25); and diabetes (aRR 1.19). In-hospital mortality increased markedly with increasing age. Aggressive implementation of prevention strategies, including social distancing and rigorous hand hygiene, may benefit the population as a whole, as well as those at highest risk for COVID-19-related complications.

34. **Redefining cardiac biomarkers in predicting mortality of inpatients with COVID-19.** Qin JJ, Cheng X, Zhou F, et al. *Hypertension*. 2020 Jul 14. doi: 10.1161/HYPERTENSIONAHA.120.15528. <https://www.ahajournals.org/doi/abs/10.1161/HYPERTENSIONAHA.120.15528>

Findings: The cutoffs of those cardiac biomarkers for effective prognosis of 28-day mortality of COVID-19 were found to be much lower than for regular heart disease at about 49% of the currently recommended thresholds. Patients with elevated cardiac injury markers above the newly established cutoffs were associated with significantly increased risk of COVID-19 death. In conclusion, cardiac biomarker elevations are significantly associated with 28-day death in patients with COVID-19. The prognostic cutoffs for of these values might be much lower than the current reference standards. These findings can assist better management of COVID-19 patients to improve outcomes. Importantly, the newly established cutoff levels of COVID-19 associated cardiac biomarkers may serve as useful criteria for the future prospective studies and clinical trials.

### Survivorship & Rehabilitation

35. **Early rehabilitation in post-acute COVID-19 patients: data from an Italian COVID-19 rehabilitation unit and proposal of a treatment protocol. A cross-sectional study.** Curci C, Pisano F, Bonacci E, Camozzi DM, et al. *Eur J Phys Rehabil Med*. 2020 Jul 15. doi: 10.23736/S1973-9087.20.06339-X. <https://www.minervamedica.it/en/journals/europa-medicophysica/article.php?cod=R33Y9999N00A20071504>

Findings: Our findings suggest that post-acute COVID-19 patients suffered from dyspnoea and shortness of breath even for minimal activities, with a resulting severe disability, and only a few of them were able to perform 6-MWT with poor results. An early rehabilitation protocol was proposed according to the baseline conditions of the patients. This study could provide an accurate description of COVID-19 subacute patients admitted to a Rehabilitation Unit along with a proposal of treatment to help physicians to tailor the best possible rehabilitative treatment.

36. **COVID-19: Myocardial injury in survivors.** Knight DS, Kotecha T, Razvi Y, et al. *Circulation*. 2020 Jul 14. doi: 10.1161/CIRCULATIONAHA.120.049252. <https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.120.049252>

Findings: In summary, myocardial injury is common in hospitalized COVID-19 patients and not exclusive to those with ACS or PE. In this single-centre, single-timepoint convalescent study, myocardial injury was associated with cardiac abnormalities detected by CMR where troponin elevation is unexplained even when cardiac function is normal. The main limitation of this study is its cross-sectional design which prompts caution regarding causality of myocardial injury and its relationship to previous COVID-19 infection. Nevertheless, CMR frequently revealed occult

coronary artery disease, high rates of myocarditis-like LGE and sometimes dual pathology. The lack of edema in these patients suggests the myocarditis-like scar may be permanent.

## Therapeutics

- 37. Dexamethasone in Hospitalized Patients with Covid-19 - Preliminary Report.** RECOVERY Collaborative Group, Horby P, Lim WS, et al. 2020 Jul 17. *N Engl J Med*. 2020;10.1056/NEJMoa2021436. <https://www.nejm.org/doi/full/10.1056/NEJMoa2021436>  
Findings: A total of 2104 patients were assigned to receive dexamethasone and 4321 to receive usual care. Overall, 482 patients (22.9%) in the dexamethasone group and 1110 patients (25.7%) in the usual care group died within 28 days after randomization (age-adjusted rate ratio, 0.83; 95% confidence interval [CI], 0.75 to 0.93; P<0.001). The proportional and absolute between-group differences in mortality varied considerably according to the level of respiratory support that the patients were receiving at the time of randomization. In the dexamethasone group, the incidence of death was lower than that in the usual care group among patients receiving invasive mechanical ventilation (29.3% vs. 41.4%; rate ratio, 0.64; 95% CI, 0.51 to 0.81) and among those receiving oxygen without invasive mechanical ventilation (23.3% vs. 26.2%; rate ratio, 0.82; 95% CI, 0.72 to 0.94) but not among those who were receiving no respiratory support at randomization (17.8% vs. 14.0%; rate ratio, 1.19; 95% CI, 0.91 to 1.55). In patients hospitalized with Covid-19, the use of dexamethasone resulted in lower 28-day mortality among those who were receiving either invasive mechanical ventilation or oxygen alone at randomization but not among those receiving no respiratory support.
- 38. Prone and lateral positioning in spontaneously breathing patients with COVID-19 pneumonia undergoing non-invasive helmet CPAP treatment.** Retucci M, Aliberti S, Ceruti C, et al. *Chest*. 2020 Jul 14. 2020;S0012-3692(20)31888-2. doi:10.1016/j.chest.2020.07.006  
[https://journal.chestnet.org/article/S0012-3692\(20\)31888-2/pdf](https://journal.chestnet.org/article/S0012-3692(20)31888-2/pdf)  
Findings: The main study findings are: 1) only a small proportion of prone/lateral positioning tests conducted in COVID-19 patients on helmet CPAP succeeded (significant improvement of gas exchange); 2) the decrease of the A-aO<sub>2</sub> was <20% (minimum clinically relevant important difference); 3) higher success rate in prone positioning VS. lateral positioning; 4) the improved gas exchange changed when the patient returned to the semi-seated position.
- 39. Efficacy and safety of interferon  $\beta$ -1a in treatment of severe COVID-19: A randomized clinical trial.** Davoudi-Monfared E, Rahmani H, Khalili H, et al. *Antimicrob Agents Chemother*. 2020 Jul 13:AAC.01061-20. doi: 10.1128/AAC.01061-20.  
<https://aac.asm.org/content/aac/early/2020/07/08/AAC.01061-20.full.pdf>  
Findings: Although IFN did not change time to reach the clinical response, adding it to the national protocol significantly increased discharge rate on day 14 and decreased 28-day mortality.
- 40. Hydroxychloroquine for Early Treatment of Adults with Mild Covid-19: A Randomized-Controlled Trial.** Mitjà O, Corbacho-Monné M, Ubals M, et al. BCN PEP-CoV-2 RESEARCH

GROUP. *Clin Infect Dis*. 2020 Jul 16:ciaa1009. doi: 10.1093/cid/ciaa1009.

<https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa1009/5872589>

Findings: A total of 293 patients were eligible for intention-to-treat analysis: 157 in the control arm and 136 in the intervention arm. The mean age was 41.6 years (SD 12.6), mean viral load at baseline was 7.90 (SD 1.82) Log<sub>10</sub> copies/mL, and median time from symptom onset to randomization was 3 days. No significant differences were found in the mean reduction of viral load at day 3 (-1.41 vs. -1.41 Log<sub>10</sub> copies/mL in the control and intervention arm, respectively; difference 0.01 [95% CI -0.28;0.29]) or at day 7 (-3.37 vs. -3.44; d -0.07 [-0.44;0.29]). This treatment regimen did not reduce risk of hospitalization (7.1%, control vs. 5.9%, intervention; RR 0.75 [0.32;1.77]) nor shortened the time to complete resolution of symptoms (12 days, control vs. 10 days, intervention; p = 0.38). No relevant treatment-related AEs were reported. In patients with mild Covid-19, no benefit was observed with HCQ beyond the usual care.

**41. Hydroxychloroquine in Nonhospitalized Adults With Early COVID-19: A Randomized Trial.**

Skipper CP, Pastick KA, Engen NW, et al. *Ann Intern Med*. 2020 Jul 16. doi: 10.7326/M20-4207.

<https://www.acpjournals.org/doi/10.7326/M20-4207>

Findings: Of 491 patients randomly assigned to a group, 423 contributed primary end point data. Of these, 341 (81%) had laboratory-confirmed infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or epidemiologically linked exposure to a person with laboratory-confirmed infection; 56% (236 of 423) were enrolled within 1 day of symptoms starting. Change in symptom severity over 14 days did not differ between the hydroxychloroquine and placebo groups (difference in symptom severity: relative, 12%; absolute, -0.27 points [95% CI, -0.61 to 0.07 points]; P = 0.117). At 14 days, 24% (49 of 201) of participants receiving hydroxychloroquine had ongoing symptoms compared with 30% (59 of 194) receiving placebo (P = 0.21). Medication adverse effects occurred in 43% (92 of 212) of participants receiving hydroxychloroquine versus 22% (46 of 211) receiving placebo (P < 0.001). With placebo, 10 hospitalizations occurred (2 non-COVID-19-related), including 1 hospitalized death. With hydroxychloroquine, 4 hospitalizations occurred plus 1 nonhospitalized death (P = 0.29). Hydroxychloroquine did not substantially reduce symptom severity in outpatients with early, mild COVID-19.

**42. Extracorporeal Membrane Oxygenation in Coronavirus Disease 2019-associated Acute Respiratory Distress Syndrome: An Initial US Experience at a High-volume Centre.** Yang Y, Rali AS, Inchaustegui C, et al. *Crit Care Med*. 2020 Jun 26;6:e17. doi: 10.15420/cfr.2020.16.

eCollection 2020 Mar. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7341259/>

Findings: The use of extracorporeal membrane oxygenation (ECMO) as salvage therapy in the most severe cases of acute respiratory distress syndrome (ARDS) has been associated with reduced mortality, particularly at high-volume centres. We report a case series of seven patients with coronavirus disease 2019 (COVID-19)-associated ARDS treated with ECMO.

**43. Deep immune profiling of COVID-19 patients reveals distinct immunotypes with therapeutic implications.** Mathew D, Giles JR, Baxter AE, Oldridge DA, et al. *Science*. 2020 Jul 15:eabc8511.

doi: 10.1126/science.abc8511.

<https://science.sciencemag.org/content/early/2020/07/15/science.abc8511>

Findings: We analyzed 125 COVID-19 patients, and compared recovered to healthy individuals using high dimensional cytometry. Integrated analysis of ~200 immune and ~50 clinical features revealed activation of T cell and B cell subsets in a proportion of patients. A subgroup of patients had T cell activation characteristic of acute viral infection and plasmablast responses reaching >30% of circulating B cells. However, another subgroup had lymphocyte activation comparable to uninfected subjects. Stable versus dynamic immunological signatures were identified and linked to trajectories of disease severity change. These analyses identified three "immunotypes" associated with poor clinical trajectories versus improving health. These immunotypes may have implications for the design of therapeutics and vaccines for COVID-19.

44. **Pharmacokinetics of lopinavir/ritonavir oral solution to treat COVID-19 in mechanically ventilated ICU patients.** Lê MP, Jaquet P, Patrier J, et al. *J Antimicrob Chemother.* 2020 Jul 20;dkaa261. doi: 10.1093/jac/dkaa261.

<https://academic.oup.com/jac/article/doi/10.1093/jac/dkaa261/5874079>

Findings: In mechanically ventilated patients with severe COVID-19 infections, the oral administration of lopinavir/ritonavir elicited plasma exposure of lopinavir more than 6-fold the upper usual expected range. However, it remains difficult to safely recommend its dose reduction without compromising the benefit of the antiviral strategy, and careful pharmacokinetic and toxicity monitoring are needed.

45. **Nutrition of the COVID-19 patient in the intensive care unit (ICU): a practical guidance.** Thibault R, Seguin R, Tamion F. *Crit Care.* 2020 Jul 19;24(1):447. doi: 10.1186/s13054-020-03159-z. <https://ccforum.biomedcentral.com/articles/10.1186/s13054-020-03159-z>

Findings: We propose a flow chart and ten key issues for optimizing the nutrition management of COVID-19 patients in the ICU.

### **Transmission / Infection Control**

46. **Novel Manufacturing of Simple Masks in Response to International Shortages: Bacterial and Particulate Filtration Efficiency Testing.** Bayersdorfer J, Giboney S, Martin R, Moore A, Bartles R. - PSJH authors. 2020 Jul 15. *Am J Infect Control.* 2020;S0196-6553(20)30704-5. doi:10.1016/j.ajic.2020.07.019

<https://www.sciencedirect.com/science/article/pii/S0196655320307045>

Findings: Many healthcare systems have been forced to outsource simple mask production due to international shortages caused by the COVID-19 pandemic. Providence created simple masks using surgical wrap and submitted samples to an environmental lab for bacterial filtration efficiency testing. Bacterial filtration efficiency (BFE) rates ranged from 83.0 - 98.1% depending on specific material and ply, and particulate filtration efficiency (PFE) rates ranged from 92.3-97.7%. Based on mask configuration, specific surgical wrap selected, and ply, the recommended filtration efficiency for isolation and surgical masks of 95% and 98%, respectively can be achieved. These alternative masks can allow for similar coverage and safety when hospital-grade isolation masks are in short supply.

47. **Decontaminating N95 and SN95 masks with Ultraviolet Germicidal Irradiation (UVGI) does not impair mask efficacy and safety: A Systematic Review.** O'Hearn K, Gertsman S, Sampson M, et al. *J Hosp Infect.* 2020 Jul 17;S0195-6701(20)30345-5. doi: 10.1016/j.jhin.2020.07.014. Findings: Thirteen studies were identified, comprising 54 UVGI intervention arms and 58 N95 models. FFRs consistently maintained certification standards following UVGI. Aerosol penetration averaged 1.19% (0.70-2.48%) and 1.14% (0.57-2.63%) for control and UVGI arms respectively. Airflow resistance for the control arms averaged 9.79 mm H<sub>2</sub>O (7.97-11.70 mm H<sub>2</sub>O) vs 9.85 mm H<sub>2</sub>O (8.33-11.44 mm H<sub>2</sub>O) for UVGI arms. UVGI protocols employing a cumulative dose >20,000 J/m<sup>2</sup> resulted in a 2 log reduction in viral load. A >3 log reduction was observed in seven UVGI arms using >40,000 J/m<sup>2</sup>. Impact of UVGI on fit was evaluated in two studies (16,200; 32,400 J/m<sup>2</sup>) and did not find evidence of compromise. Our findings suggest that further work in this area (or translation to a clinical setting) should use a cumulative UV-C dose of 40,000 J/m<sup>2</sup> or greater, and confirm appropriate mask fit following decontamination.
48. **SARS-CoV-2 RNAemia in a Healthy Blood Donor 40 Days after Respiratory Illness Resolution.** Pham TD, Huang C, Wirz OF, et al. 2020 Jul 17. *Ann Intern Med.* 2020;10.7326/L20-0725. doi:10.7326/L20-0725 <https://www.acpjournals.org/doi/full/10.7326/L20-0725> Findings: confirmation of donor RNAemia more than 1 month after symptom resolution is concerning in light of current guidelines, which do not recommend SARS-CoV-2 screening in the general allogeneic donor population (5). In this case, plasma viral RNA was reproducibly detected at a time point that exceeded recommendations for deferral based on time since symptom resolution (14 days). Of importance, these results are unlikely to be false-positive given that 2 different regions of the SARS-CoV-2 genome were detected in separate specimens collected on the day of donation and that quality control passed on all runs, including the absence of amplification in the negative controls. Of note, however, the infectivity of SARS-CoV-2 from blood remains unknown and, to date, we are not aware of cases of transfusion-transmitted COVID-19. Furthermore, the risk for transmission of other transfusion-transmitted viral infections, such as HIV-1, is correlated with virus load, indicating that if bloodborne transmission is possible, the low level of SARS-CoV-2 detected in this case was unlikely to be transmitted. Taken together, these data suggest that this donor posed a limited but uncertain risk to the safety of the blood supply.
49. **Absence of Apparent Transmission of SARS-CoV-2 from Two Stylists After Exposure at a Hair Salon with a Universal Face Covering Policy — Springfield, Missouri, May 2020.** Hendrix MJ, Walde C, Findley K, Trotman R. *MMWR Morb Mortal Wkly Rep.* ePub: 14 July 2020. DOI: [http://dx.doi.org/10.15585/mmwr.mm6928e2external icon](http://dx.doi.org/10.15585/mmwr.mm6928e2external%20icon) <https://www.cdc.gov/mmwr/volumes/69/wr/mm6928e2.htm> Findings: Among 139 clients exposed to two symptomatic hair stylists with confirmed COVID-19 while both the stylists and the clients wore face masks, no symptomatic secondary cases were reported; among 67 clients tested for SARS-CoV-2, all test results were negative. Adherence to the community's and company's face-covering policy likely mitigated spread of SARS-CoV-2.

50. **Physical distancing interventions and incidence of coronavirus disease 2019: natural experiment in 149 countries.** Islam N, Sharp SJ, Chowell G, et al. *BMJ* 2020; 370 :m2743 <https://www.bmj.com/content/370/bmj.m2743>

Findings: On average, implementation of any physical distancing intervention was associated with an overall reduction in covid-19 incidence of 13% (IRR 0.87, 95% confidence interval 0.85 to 0.89; n=149 countries). Closure of public transport was not associated with any additional reduction in covid-19 incidence when the other four physical distancing interventions were in place (pooled IRR with and without public transport closure was 0.85, 0.82 to 0.88; n=72, and 0.87, 0.84 to 0.91; n=32, respectively). Data from 11 countries also suggested similar overall effectiveness (pooled IRR 0.85, 0.81 to 0.89) when school closures, workplace closures, and restrictions on mass gatherings were in place. In terms of sequence of interventions, earlier implementation of lockdown was associated with a larger reduction in covid-19 incidence (pooled IRR 0.86, 0.84 to 0.89; n=105) compared with a delayed implementation of lockdown after other physical distancing interventions were in place (pooled IRR 0.90, 0.87 to 0.94; n=41). Physical distancing interventions were associated with reductions in the incidence of covid-19 globally. No evidence was found of an additional effect of public transport closure when the other four physical distancing measures were in place. Earlier implementation of lockdown was associated with a larger reduction in the incidence of covid-19. These findings might support policy decisions as countries prepare to impose or lift physical distancing measures in current or future epidemic waves.

51. **Association between Universal Masking in a Health Care System and SARS-CoV-2 Positivity among Health Care Workers.** Wang X, Ferro EG, Zhou G, et al. *JAMA*. July 14, 2020. doi:10.1001/jama.2020.12897 <https://jamanetwork.com/journals/jama/fullarticle/2768533>

Findings: Universal masking at MGB was associated with a significantly lower rate of SARS-CoV-2 positivity among HCWs. This association may be related to a decrease in transmission between patients and HCWs and among HCWs. The decrease in HCW infections could be confounded by other interventions inside and outside of the health care system, such as restrictions on elective procedures, social distancing measures, and increased masking in public spaces, which are limitations of this study. Despite these local and statewide measures, the case number continued to increase in Massachusetts throughout the study period, suggesting that the decrease in the SARS-CoV-2 positivity rate in MGB HCWs took place before the decrease in the general public. Randomized trials of universal masking of HCWs during a pandemic are likely not feasible. Nonetheless, these results support universal masking as part of a multipronged infection reduction strategy in health care settings.

## Vaccine

52. **Immunogenicity and safety of a recombinant adenovirus type-5-vectored COVID-19 vaccine in healthy adults aged 18 years or older: a randomised, double-blind, placebo-controlled, phase 2 trial.** Zhu F, Guan X, Li Y, et al. *Lancet* July 20, 2020 DOI:[https://doi.org/10.1016/S0140-6736\(20\)31605-6](https://doi.org/10.1016/S0140-6736(20)31605-6) [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)31605-6/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31605-6/fulltext)

Findings: In this study, a single injection of the Ad5-vectored COVID-19 vaccine at  $1 \times 10^{11}$  viral particles and  $5 \times 10^{10}$  viral particles induced comparable specific immune responses to the spike glycoprotein at day 28, with no significant differences noted between the two groups. The vaccine induced seroconversion of the neutralising antibodies in 59% and 47% of participants, and seroconversion of binding antibody in 96% and 97% of participants, in the  $1 \times 10^{11}$  and  $5 \times 10^{10}$  viral particles dose groups, respectively. Most reactions reported post vaccination were mild or moderate. Although the proportions of participants who had adverse reactions such as fever, fatigue, and injection site pain were significantly higher in vaccine recipients than those in placebo recipients, adverse reactions within 28 days were generally not severe, and resolved in less than 48 h.

53. **Safety and immunogenicity of the ChAdOx1 nCoV-19 vaccine against SARS-CoV-2: a preliminary report of a phase 1/2, single-blind, randomised controlled trial.** Folegatti PM, Ewer KJ, Aley PK, et al. *Lancet* July 20, 2020 DOI: [https://doi.org/10.1016/S0140-6736\(20\)31604-4](https://doi.org/10.1016/S0140-6736(20)31604-4) [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)31604-4/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31604-4/fulltext)  
Findings: Our preliminary findings show that the candidate ChAdOx1 nCoV-19 vaccine given as a single dose was safe and tolerated, despite a higher reactogenicity profile than the control vaccine, MenACWY. No serious adverse reactions to ChAdOx1 nCoV-19 occurred. The majority of adverse events reported were mild or moderate in severity, and all were self-limiting.
54. **An mRNA Vaccine against SARS-CoV-2 - Preliminary Report.** Jackson LA, Anderson EJ, Roupael NG, Roberts PC, Makhene M, Coler RN, et al. *N Engl J Med.* 2020 Jul 14. doi: 10.1056/NEJMoa2022483. <https://www.nejm.org/doi/full/10.1056/NEJMoa2022483>  
Findings: After the first vaccination, antibody responses were higher with higher dose (day 29 enzyme-linked immunosorbent assay anti-S-2P antibody geometric mean titer [GMT], 40,227 in the 25- $\mu$ g group, 109,209 in the 100- $\mu$ g group, and 213,526 in the 250- $\mu$ g group). After the second vaccination, the titers increased (day 57 GMT, 299,751, 782,719, and 1,192,154, respectively). After the second vaccination, serum-neutralizing activity was detected by two methods in all participants evaluated, with values generally similar to those in the upper half of the distribution of a panel of control convalescent serum specimens. Solicited adverse events that occurred in more than half the participants included fatigue, chills, headache, myalgia, and pain at the injection site. Systemic adverse events were more common after the second vaccination, particularly with the highest dose, and three participants (21%) in the 250- $\mu$ g dose group reported one or more severe adverse events. The mRNA-1273 vaccine induced anti-SARS-CoV-2 immune responses in all participants, and no trial-limiting safety concerns were identified. These findings support further development of this vaccine.

## Women & Children

55. **Maternal mortality and COVID-19.** Takemoto MLS, Menezes MO, Andreucci CB, et al. 2020 Jul 16. *J Matern Fetal Neonatal Med.* 2020;1-7. doi:10.1080/14767058.2020.1786056 <https://www.tandfonline.com/doi/full/10.1080/14767058.2020.1786056>  
Findings: We identified 20 COVID-19-related maternal deaths, age range 20-43 years. Symptoms onset was reported as on pregnancy for 12 cases, postpartum for 3 cases, and

during the cesarean section for 1 case (missing data for 4). In 16 cases, death occurred in the postpartum period. At least one comorbidity or risk factor was present in 11 cases (missing data for 4). Asthma was the most common risk factor (5/11). To the best of our knowledge, this is the largest available series of maternal deaths due to COVID-19. Barriers to access healthcare, differences in pandemic containment measures in the country and high prevalence of concomitant risk factors for COVID-19 severe disease may play a role in the observed disparity compared to worldwide reports on maternal outcomes.

56. **A critical review of the pathophysiology of thrombotic complications and clinical practice recommendations for thromboprophylaxis in pregnant patients with COVID-19.** D'Souza R, Malhamé I, Teshler L, et al. 2020 Jul 17. *Acta Obstet Gynecol Scand.* 2020;10.1111/aogs.13962. <https://obgyn.onlinelibrary.wiley.com/doi/10.1111/aogs.13962>

Findings: Decisions about initiation and duration of prophylactic anticoagulation in the context of pregnancy and COVID-19 must take into consideration disease severity, outpatient versus inpatient status, temporal relationship between disease occurrence and timing of childbirth, and the underlying prothrombotic risk conferred by additional comorbidities. There is currently no evidence to recommend the use of intermediate or therapeutic doses of LMWH in thromboprophylaxis, which may increase bleeding risk without reducing thrombotic risk in pregnant patients with COVID-19. Likewise, there is no evidence to comment on the role of low-dose aspirin in thromboprophylaxis or of anti-cytokine and antiviral agents in preventing immunothrombosis.

57. **Clinical Manifestations and Outcomes of Critically Ill Children and Adolescents with COVID-19 in New York City.** Derespina KR, Kaushik S, Plichta A, et al. 2020 Jul 15. *J Pediatr.* 2020;S0022-3476(20)30888-X. doi:10.1016/j.jpeds.2020.07.039 [https://www.jpeds.com/article/S0022-3476\(20\)30888-X/fulltext](https://www.jpeds.com/article/S0022-3476(20)30888-X/fulltext)

Findings: Of 70 children admitted to PICUs: median age 15 [IQR 9, 19] years; 61.4% male; 38.6% Hispanic; 32.9% Black; 74.3% with comorbidities. Fever (72.9%) and cough (71.4%) were the common presenting symptoms. Twelve patients (17%) met severe sepsis criteria; 14 (20%) required vasopressor support; 21 (30%) developed acute respiratory distress syndrome (ARDS); 9 (12.9%) met acute kidney injury criteria; 1 (1.4%) required renal replacement therapy, and 2 (2.8%) had cardiac arrest. For treatment, 27 (38.6%) patients received hydroxychloroquine; 13 (18.6%) remdesivir; 23 (32.9%) corticosteroids; 3 (4.3%) tocilizumab; 1 (1.4%) anakinra; no patient was given immunoglobulin or convalescent plasma. Forty-nine (70%) patients required respiratory support: 14 (20.0%) non-invasive mechanical ventilation, 20 (28.6%) invasive mechanical ventilation (IMV), 7 (10%) prone position, 2 (2.8%) inhaled nitric oxide, and 1 (1.4%) extracorporeal membrane oxygenation. Nine (45%) of the 20 patients requiring IMV were extubated by day 14 with median IMV duration of 218 [IQR 79, 310.4] hours. Presence of ARDS was significantly associated with duration of PICU and hospital stay, and lower probability of PICU and hospital discharge at hospital day 14 ( $P < .05$  for all).

58. **Transplacental transmission of SARS-CoV-2 infection.** Vivanti AJ, Vauloup-Fellous C, Prevot S, et al. *Nat Commun.* 2020 Jul 14;11(1):3572. doi: 10.1038/s41467-020-17436-6. <https://www.nature.com/articles/s41467-020-17436-6>

Findings: We demonstrate the transplacental transmission of SARS-CoV-2 in a neonate born to a mother infected in the last trimester and presenting with neurological compromise. The transmission is confirmed by comprehensive virological and pathological investigations. In detail, SARS-CoV-2 causes: (1) maternal viremia, (2) placental infection demonstrated by immunohistochemistry and very high viral load; placental inflammation, as shown by histological examination and immunohistochemistry, and (3) neonatal viremia following placental infection. The neonate is studied clinically, through imaging, and followed up. The neonate presented with neurological manifestations, similar to those described in adult patients.

59. **COVID-19 Disease Severity Risk Factors for Pediatric Patients in Italy.** Bellino S, Punzo O, Rota MC, et al. *Pediatrics*. 2020 Jul 14:e2020009399. doi: 10.1542/peds.2020-009399.

<https://pediatrics.aappublications.org/content/pediatrics/early/2020/07/11/peds.2020-009399.full.pdf>

Findings: Pediatric cases (3,836) accounted for 1.8% of total infections (216,305), the median age was 11 years, 51.4% were males, 13.3% were hospitalized, and 5.4% presented underlying medical conditions. The disease was mild in 32.4% of cases and severe in 4.3%, particularly in children  $\leq 6$  years old (10.8%); among 511 hospitalized patients, 3.5% were admitted in Intensive Care Unit (ICU), and four deaths occurred. Lower risk of disease severity was associated with increasing age and calendar time, whereas a higher risk was associated with pre-existing underlying medical conditions (OR=2.80, 95% CI 1.74-4.48). Hospitalization rate, admission in ICU, disease severity, and days from symptoms onset to recovery significantly increased with age among children, adults and elderly. Data suggest that pediatric cases of COVID-19 are less severe than adults, however, age  $\leq 1$  year and the presence of underlying conditions represent severity risk factors.

60. **COVID-19: A Review for the Pediatric Neurologist.** Christy, Alison – PSJH author. *J Child Neurol*. 2020 Jul 13;883073820939387. doi: 10.1177/0883073820939387.

ser<https://journals.sagepub.com/doi/pdf/10.1177/0883073820939387>

---

## GUIDELINES & CONSENSUS STATEMENTS

[Multisystem Inflammatory Syndrome in Children \(MIS-C\) Interim Guidance.](#) American Academy of Pediatrics.

[Returning to Play After Coronavirus Infection: Pediatric Cardiologists' Perspective.](#) Dean PN, Jackson L, Paridon SM. American College of Cardiology 2020 Jul 14.

---

## FDA / CDC / NIH/ WHO Updates

CDC: [Considerations for Release of Stockpiled N95s Beyond the Manufacturer-Designated Shelf Life](#)

CDC: [Discontinuation of Transmission-Based Precautions and Disposition of Patients with COVID-19 in Healthcare Settings \(Interim Guidance\)](#)

**CDC:** [Interim Guidance on Testing Healthcare Personnel for SARS-CoV-2](#)

**FDA:** [Coronavirus \(COVID-19\) Update: FDA Issues First Emergency Authorization for Sample Pooling in Diagnostic Testing](#)

Press Release

[Synairgen announces positive results from trial of SNG001 in hospitalised COVID-19 patients \(inhaled interferon beta\).](#)

---

Commentary

[EXPOSED, SILENCED, ATTACKED: FAILURES TO PROTECT HEALTH AND ESSENTIAL WORKERS DURING THE COVID-19 PANDEMIC](#)

[The Heroes and Heroines: Supporting the Front Line in New York City During Covid-19](#)

[Universal Masking to Prevent SARS-CoV-2 Transmission—The Time Is Now](#)

---

If you would like to receive a **customized COVID-19 Topic Alert** related to your specialty or area of interest, would like a **literature search** conducted, or have difficulty **accessing** any of the above articles please contact us at [librarian@providence.org](mailto:librarian@providence.org)

Find previous weeks [here](#).