

## COVID-19 Resource Desk

#4 | 5.13.2020 to 5.19.2020

Prepared by [System Library Services](#)

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### New Research

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

#### Basic Science / Virology / Pre-clinical

- 1. Respiratory disease in rhesus macaques inoculated with SARS-CoV-2.** Munster VJ, Feldmann F, Williamson BN, et al. 2020 May 12. *Nature*. 2020;10.1038/s41586-020-2324-7. doi:10.1038/s41586-020-2324-7 <https://www.nature.com/articles/s41586-020-2324-7>  
Findings: Here, we show that SARS-CoV-2 causes respiratory disease in infected rhesus macaques, with disease lasting 8-16 days. Pulmonary infiltrates, a hallmark of human disease, were visible in lung radiographs. High viral loads were detected in swabs from the nose and throat of all animals as well as in bronchoalveolar lavages; in one animal we observed prolonged rectal shedding. Taken together, the rhesus macaque recapitulates moderate disease observed in the majority of human cases. The establishment of the rhesus macaque as a model of COVID-19 will increase our understanding of the pathogenesis of this disease and will aid development and testing of medical countermeasures.
- 2. Cross-neutralization of SARS-CoV-2 by a human monoclonal SARS-CoV antibody.** Pinto, D., Park, Y., Beltramello, M. et al. *Nature* (2020). <https://doi.org/10.1038/s41586-020-2349-y> <https://www.nature.com/articles/s41586-020-2349-y>  
Findings: Here we describe multiple monoclonal antibodies targeting SARS-CoV-2 S identified from memory B cells of an individual who was infected with SARS-CoV in 2003. One antibody, named S309, potently neutralizes SARS-CoV-2 and SARS-CoV pseudoviruses as well as authentic SARS-CoV-2 by engaging the S receptor-binding domain. Using cryo-electron microscopy and binding assays, we show that S309 recognizes a glycan-containing epitope that is conserved within the sarbecovirus subgenus, without competing with receptor attachment. Antibody cocktails including S309 along with other antibodies identified here further enhanced SARS-CoV-2 neutralization and may limit the emergence of neutralization-escape mutants. These results pave the way for using S309- and S309-containing antibody cocktails for prophylaxis in individuals at high risk of exposure or as a post-exposure therapy to limit or treat severe disease.

#### Clinical Syndrome

- 3. AGA Institute rapid review of the GI and liver manifestations of COVID-19, meta-analysis of international data, and recommendations for the consultative management of patients with COVID-19.** Sultan S et al. *Gastroenterology* 2020 May 11.

doi:<https://doi.org/10.1053/j.gastro.2020.05.001>

<https://www.sciencedirect.com/science/article/pii/S001650852030593X>

Findings: We identified 118 studies and used a hierarchical study selection process to identify unique cohorts. We performed a meta-analysis of 47 studies including 10,890 unique patients. Pooled prevalence estimates of GI symptoms was diarrhea 7.7% (95% CI 7.2-8.2), nausea/vomiting 7.8% (95% CI 7.1-8.5), abdominal pain 2.7% (95% CI 2.0- 3.4). Most studies reported on hospitalized patients. The pooled prevalence of elevated liver abnormalities was: AST 15.0% (13.6 to 16.5) and ALT 15.0% (13.6 to 16.4). When analyzed comparing data from China to studies from countries other than China, diarrhea, nausea/vomiting, liver abnormalities were more prevalent outside of China with diarrhea reported in 18.3% (16.6 to 20.1). Isolated GI symptoms were rarely reported. We also summarized of the GI and liver adverse effects of the most commonly utilized medications for COVID19.

4. **Multiorgan and Renal Tropism of SARS-CoV-2.** Puelles VG et al. *NEJM* 2020 May 13. doi: 10.1056/NEJMc2011400 <https://www.nejm.org/doi/full/10.1056/NEJMc2011400>  
Findings: We first quantified the SARS-CoV-2 viral load in autopsy tissue samples obtained from 22 patients who had died from Covid-19. Seventeen patients (77%) had more than two coexisting conditions, and a greater number of coexisting conditions was associated with SARS-CoV-2 tropism for the kidneys, even in patients without a history of chronic kidney disease. The highest levels of SARS-CoV-2 copies per cell were detected in the respiratory tract, and lower levels were detected the kidneys, liver, heart, brain, and blood. These findings indicate a broad organotropism of SARS-CoV-2.
5. **Immune response to SARS-CoV-2 and mechanisms of immunopathological changes in COVID-19.** Azkur AK, Akdis M, Azkur D, et al. 2020 May 12. *Allergy*. 2020;10.1111/all.14364. doi:10.1111/all.14364  
<https://onlinelibrary.wiley.com/doi/epdf/10.1111/all.14364>  
Findings: In this review, we aim to improve our understanding on the immune response and immunopathological changes in patients linked to deteriorating clinical conditions such as, cytokine storm, acute respiratory distress syndrome, autopsy findings and changes in acute phase reactants and serum biochemistry in COVID-19. High viral-load during the first infection and repeated exposure to virus especially in healthcare workers can be an important factor for severity of disease. It should be noted that many aspects of severe patients are unique to COVID-19 and are rarely observed in other respiratory viral infections, such as severe lymphopenia and eosinopenia, extensive pneumonia and lung tissue damage, a cytokine storm leading to acute respiratory distress syndrome and multiorgan failure. Lymphopenia causes a defect in antiviral and immune regulatory immunity. At the same time, a cytokine storm starts with extensive activation of cytokine-secreting cells with innate and adaptive immune mechanisms both of which contribute to a poor prognosis. Elevated levels of acute phase reactants and lymphopenia are early predictors of high disease severity.
6. **25-Hydroxyvitamin D Concentrations Are Lower in Patients with Positive PCR for SARS-CoV-2.** D'Avolio A, Avataneo V, Manca A, et al. *Nutrients*. 2020 May 9;12(5). pii: E1359. doi: 10.3390/nu12051359.

<https://www.mdpi.com/2072-6643/12/5/1359>

Findings: We retrospectively investigated the 25-hydroxyvitamin D (25(OH)D) concentrations in plasma obtained from a cohort of patients from Switzerland. In this cohort, significantly lower levels were found in PCR-positive for SARS-CoV-2 patients compared with negative patients; this was also confirmed by stratifying patients according to age >70 years. On the basis of this preliminary observation, vitamin D supplementation might be a useful measure to reduce the risk of infection. Randomized controlled trials and large population studies should be conducted to evaluate these recommendations and to confirm our preliminary observation.

7. **Co-infection with respiratory pathogens among COVID-2019 cases.** Zhu X, Ge Y, Wu T, et al. *Virus Res.* 2020 May 11;285:198005. doi: 10.1016/j.virusres.2020.198005.

<https://www.sciencedirect.com/science/article/pii/S0168170220303531>

Findings: Accumulating evidence shows that microbial co-infection increases the risk of disease severity in humans. In this retrospective study, 257 laboratory-confirmed COVID-19 patients in Jiangsu Province were enrolled from January 22 to February 2, 2020. They were re-confirmed by real-time RT-PCR and tested for 39 respiratory pathogens. In total, 24 respiratory pathogens were found among the patients, and 242 (94.2 %) patients were co-infected with one or more pathogens. Bacterial co-infections were dominant in all COVID-19 patients, *Streptococcus pneumoniae* was the most common, followed by *Klebsiella pneumoniae* and *Haemophilus influenzae*. The highest and lowest rates of co-infections were found in patients aged 15-44 and below 15, respectively. Most co-infections occurred within 1-4 days of onset of COVID-19 disease. In addition, the proportion of viral co-infections, fungal co-infections and bacterial-fungal co-infections were the highest severe COVID-19 cases.

8. **The clinical characteristic of eight patients of COVID-19 with positive RT-PCR test after discharge.** Cao H, Ruan L, Liu J, Liao W. *J Med Virol.* 2020 May 15. doi: 10.1002/jmv.26017.

<https://onlinelibrary.wiley.com/doi/10.1002/jmv.26017>

Findings: In a retrospective review of medical records from Tongji Hospital of Hua Zhong University of Science and Technology 108 patients of COVID-19 were admitted. Eight cases were readmission patients because the RT-PCR result of SARS-CoV-2 was positive after discharge. On the second admission, patients had no symptoms and their chest CT was almost normal. Data from laboratory tests showed that all eight patients had normal white blood cell count, lymphocyte count. The inflammatory factors like procalcitonin and interleukin 6 were normal. These patients could be a source of infection, or become chronic virus carriers.

9. **Pulmonary Arterial Thrombosis in COVID-19 With Fatal Outcome: Results From a Prospective, Single-Center, Clinicopathologic Case Series.** Lax SF et al. *Ann Intern Med* 2020 May 14. doi:

<https://doi.org/10.7326/M20-2566>

<https://www.acpjournals.org/doi/10.7326/M20-2566>

Findings: COVID-19 predominantly involves the lungs, causing DAD and leading to acute respiratory insufficiency. Death may be caused by the thrombosis observed in segmental and subsegmental pulmonary arterial vessels despite the use of prophylactic anticoagulation. Studies are needed to further understand the thrombotic complications of COVID-19, together with the roles for strict thrombosis prophylaxis, laboratory, and imaging studies and early

anticoagulant therapy for suspected pulmonary arterial thrombosis or thromboembolism.

- 10. Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: a systematic review and meta-analysis with comparison to the COVID-19 pandemic.** Rogers JP et al. *Lancet* 2020 May 18. doi: [https://doi.org/10.1016/S2215-0366\(20\)30203-0](https://doi.org/10.1016/S2215-0366(20)30203-0)  
[https://www.thelancet.com/journals/lanpsy/article/PIIS2215-0366\(20\)30203-0/fulltext](https://www.thelancet.com/journals/lanpsy/article/PIIS2215-0366(20)30203-0/fulltext)  
Findings: If infection with SARS-CoV-2 follows a similar course to that with SARS-CoV or MERS-CoV, most patients should recover without experiencing mental illness. SARS-CoV-2 might cause delirium in a significant proportion of patients in the acute stage. Clinicians should be aware of the possibility of depression, anxiety, fatigue, post-traumatic stress disorder, and rarer neuropsychiatric syndromes in the longer term.

### Diagnosics & Screening

- 11. Performance of the rapid Nucleic Acid Amplification by Abbott ID NOW COVID-19 in nasopharyngeal swabs transported in viral media and dry nasal swabs, in a New York City academic institution.** Atreyee Basu, Tatyana Zinger, Kenneth Inglima, et al. PREPRINT  
<https://www.biorxiv.org/content/10.1101/2020.05.11.089896v1>  
Findings: The need to identify the COVID-19 positive cases quickly and accurately has propelled the release of a variety of assays intended to meet the urgent demand. Our laboratory (New York University) currently uses two real time RT-PCR platforms, the Roche Cobas SARS-CoV2 and the Cepheid Xpert Xpress SARS-CoV-2. Both platforms demonstrate comparable performance; however the run times for each assay are 3.5 hours and 45 minutes, respectively. We sought to evaluate the recently released Abbott ID NOW COVID-19 assay which is capable of producing positive results in as little as 5 minutes. Abbot ID NOW COVID-19 missed a third of the samples detected positive by Cepheid Xpert Xpress when using NP swabs in VTM and over 48% when using dry nasal swabs.
- 12. Symptom Criteria for COVID-19 Testing of Health Care Workers.** Clemency BM, Varughese R, Scheafer DK, et al. *Acad Emerg Med*. 2020 May 12. doi: 10.1111/acem.14009.  
<https://onlinelibrary.wiley.com/doi/epdf/10.1111/acem.14009>  
Findings: 961 HCW were included in the analysis, of which 225 (23%) had positive test results. The existing testing criteria consisting of any combination of one or more of three symptoms (fever, shortness of breath, dry cough) was 93% sensitive and 9% specific (AUC = 0.63, 95% CI: 0.59 - 0.67). The derived testing criteria consisting of any combination of one or more of two symptoms (fever, loss of taste or smell) was 89% sensitive and 48% specific (AUC = 0.75, 95% CI: 0.71 - 0.78). The hybrid testing criteria consisting of any combination of one or more of four symptoms (fever, shortness of breath, dry cough, loss of taste or smell) was 98% sensitive and 8% specific (AUC = 0.77, 95% CI: 0.73 - 0.80). An evidence based approach to COVID-19 testing which at least includes fever and loss of taste or smell should be utilized when determining which HCW should be tested.
- 13. Variation in False-Negative Rate of Reverse Transcriptase Polymerase Chain Reaction–Based SARS-CoV-2 Tests by Time since Exposure.** Kucirka LM et al. *Ann Intern Med* 2020 May 13. doi:

<https://doi.org/10.7326/M20-1495>"<https://doi.org/10.7326/M20-1495>

<https://www.acpjournals.org/doi/abs/10.7326/M20-1495>

Findings: Over the 4 days of infection before the typical time of symptom onset, the probability of a false-negative result in an infected person decreases from 100% (95% CI, 100% to 100%) on day 1 to 67% (CI, 27% to 94%) on day 4. On the day of symptom onset, the median false-negative rate was 38% (CI, 18% to 65%). This decreased to 20% (CI, 12% to 30%) on day 8 (3 days after symptom onset) then began to increase again, from 21% (CI, 13% to 31%) on day 9 to 66% (CI, 54% to 77%) on day 21.

14. **Chest CT for detecting COVID-19: a systematic review and meta-analysis of diagnostic accuracy.** Xu B, Xing Y, Peng J, et al. *Eur Radiol.* 2020 May 15. doi: 10.1007/s00330-020-06934-2. <https://link.springer.com/article/10.1007/s00330-020-06934-2>

Findings: Chest CT offers the great sensitivity for detecting COVID-19, especially in a region with severe epidemic situation. However, the specificity is low. In the context of emergency disease control, chest CT provides a fast, convenient, and effective method to early recognize suspicious cases and might contribute to confine epidemic.

15. **Self-collection: An appropriate alternative during the SARS-CoV-2 pandemic.** Wehrhahn MC, Robson J, Brown S, et al. *J Clin Virol.* 2020 May 4;128:104417. doi: 10.1016/j.jcv.2020.104417. <https://www.mdpi.com/2072-6643/12/5/1359>

Findings: Self-collection of nasal and throat swabs offers a reliable alternative to health worker collection for the diagnosis of SARS-CoV-2 and other respiratory viruses and provides patients with easier access to testing, reduces exposure of the community and health workers to those being tested and reduces requirement for PPE.

### **Epidemiology & Public Health**

16. **Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period.**

Kissler SM, Tedijanto C, Goldstein E, Grad YH, Lipsitch M. *Science* 2020 Apr 14. doi: 10.1126/science.abb5793

<https://science.sciencemag.org/content/early/2020/05/11/science.abb5793/tab-pdf>

Findings: We used estimates of seasonality, immunity, and cross-immunity for betacoronaviruses OC43 and HKU1 from time series data from the USA to inform a model of SARS-CoV-2 transmission. We projected that recurrent wintertime outbreaks of SARS-CoV-2 will probably occur after the initial, most severe pandemic wave. Absent other interventions, a key metric for the success of social distancing is whether critical care capacities are exceeded. To avoid this, prolonged or intermittent social distancing may be necessary into 2022. Additional interventions, including expanded critical care capacity and an effective therapeutic, would improve the success of intermittent distancing and hasten the acquisition of herd immunity. Even in the event of apparent elimination, SARS-CoV-2 surveillance should be maintained since a resurgence in contagion could be possible as late as 2024.

17. **Seroprevalence of SARS-CoV-2–Specific Antibodies Among Adults in Los Angeles County, California, on April 10–11, 2020.** Sood N, Simon P, Ebner P, et al. *JAMA.* Published online May

18, 2020. doi:10.1001/jama.2020.8279

<https://jamanetwork.com/journals/jama/fullarticle/2766367?resultClick=1>

Findings: In this community seroprevalence study in Los Angeles County, the prevalence of antibodies to SARS-CoV-2 was 4.65%. The estimate implies that approximately 367,000 adults had SARS-CoV-2 antibodies, which is substantially greater than the 8,430 cumulative number of confirmed infections in the county on April 10. Therefore, fatality rates based on confirmed cases may be higher than rates based on number of infections.

18. **Preliminary Estimate of Excess Mortality during the COVID-19 Outbreak - New York City, March 11-May 2, 2020.** New York City Department of Health and Mental Hygiene (DOHMH) COVID-19 Response Team. *MMWR Morb Mortal Wkly Rep.* 2020 May 15;69(19):603-605. doi:10.15585/mmwr.mm6919e5.

<https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e5.htm>

Findings: During March 11–May 2, 2020, a total of 32,107 deaths were reported to DOHMH; of these deaths, 24,172 were found to be in excess of the seasonal expected baseline. Included in the 24,172 deaths were 13,831 (57%) laboratory-confirmed COVID-19–associated deaths and 5,048 (21%) probable COVID-19–associated deaths, leaving 5,293 (22%) excess deaths that were not identified as either laboratory-confirmed or probable COVID-19–associated deaths. The percentages of these excess deaths that occurred in persons infected with SARS-CoV-2 or resulted from indirect impacts of the pandemic are unknown and require further investigation

19. **Assessment of Deaths From COVID-19 and From Seasonal Influenza.** Faust JS, Del Rio C. *JAMA Intern Med.* 2020 May 14. doi: 10.1001/jamainternmed.2020.2306.

<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2766121>

Findings: The apparent equivalence of deaths from COVID-19 and seasonal influenza does not match frontline clinical conditions, especially in some hot zones of the pandemic where ventilators have been in short supply and many hospitals have been stretched beyond their limits. The demand on hospital resources during the COVID-19 crisis has not occurred before in the US, even during the worst of influenza seasons. Yet public officials continue to draw comparisons between seasonal influenza and SARS-CoV-2 mortality, often in an attempt to minimize the effects of the unfolding pandemic.

20. **Characteristics and Outcomes of Coronavirus Disease Patients under Nonsurge Conditions, Northern California, USA, March-April 2020.** Ferguson J, Rosser JI, Quintero O, Scott J, Subramanian A, Gumma M, Rogers A, Kappagoda S. *Emerg Infect Dis.* 2020 May 14;26(8). doi: 10.3201/eid2608.201776. [https://wwwnc.cdc.gov/eid/article/26/8/20-1776\\_article](https://wwwnc.cdc.gov/eid/article/26/8/20-1776_article)

Findings: Limited data are available on the clinical presentation and outcomes of coronavirus disease (COVID-19) patients in the United States hospitalized under normal-caseload or nonsurge conditions. We retrospectively studied 72 consecutive adult patients hospitalized with COVID-19 in 2 hospitals in the San Francisco Bay area, California, USA, during March 13–April 11, 2020. The death rate for all hospitalized COVID-19 patients was 8.3%, and median length of hospitalization was 7.5 days. In this study, death rates were lower than those reported from regions of the United States experiencing a high volume of COVID-19 patients.

21. **Strong Social Distancing Measures In The United States Reduced The COVID-19 Growth Rate.** Courtemanche C, Garuccio J, Le A, Pinkston J, Yelowitz A. 8. *Health Aff (Millwood)*. 2020 May 14;101377hlthaff202000608. doi:10.1377/hlthaff.2020.00608.  
<https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2020.00608>  
Findings: Adoption of government-imposed social distancing measures reduced the daily growth rate by 5.4 percentage points after 1-5 days, 6.8 after 6-10 days, 8.2 after 11-15 days, and 9.1 after 16-20 days. Holding the amount of voluntary social distancing constant, these results imply 10 times greater spread by April 27 without SIPOs (10 million cases) and more than 35 times greater spread without any of the four measures (35 million). Our paper illustrates the potential danger of exponential spread in the absence of interventions, providing relevant information to strategies for restarting economic activity.
22. **Comparison of Estimated Rates of Coronavirus Disease 2019 (COVID-19) in Border Counties in Iowa Without a Stay-at-Home Order and Border Counties in Illinois With a Stay-at-Home Order.** Lyu W, Wehby GL. *JAMA Netw Open*. 2020 May 1;3(5):e2011102. doi:10.1001/jamanetworkopen.2020.11102.  
<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2766229>  
Findings: This cross-sectional study with a difference-in-differences design found an increase in estimated rates of COVID-19 cases per 10 000 residents in the border counties in Iowa compared with the border counties in Illinois following a stay-at-home order that was implemented in Illinois but not in Iowa.
23. **Assessing Differential Impacts of COVID-19 on Black Communities.** Millett GA, Jones AT, Benkeser D, et al. *Annals of Epidemiology*. 2020 May 14.  
<https://doi.org/10.1016/j.annepidem.2020.05.003>  
<https://www.sciencedirect.com/science/article/pii/S1047279720301769>  
Findings: Nearly twenty-two percent of US counties are disproportionately black and they accounted for 52% of COVID-19 diagnoses and 58% of COVID-19 deaths nationally. County-level comparisons can both inform COVID-19 responses and identify epidemic hot spots. Social conditions, structural racism, and other factors elevate risk for COVID-19 diagnoses and deaths in black communities.
24. **Risk factors for SARS-CoV-2 among patients in the Oxford Royal College of General Practitioners Research and Surveillance Centre primary care network: a cross-sectional study.** de Lusignan S, Dorward J, Correa A, et al. *Lancet Infectious Diseases*. 2020 May 15.  
[https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(20\)30371-6/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30371-6/fulltext)  
Findings: We provide evidence of potential sociodemographic factors associated with a positive test, including deprivation, population density, ethnicity, and chronic kidney disease.

### Healthcare Delivery & Healthcare Workers

25. **Rapid Deployment of a Statewide COVID-19 ECHO Program for Frontline Clinicians: Early Results and Lessons Learned.** Steeves-Reece AL, Elder NC, Graham TA, et al. *J Rural Health*.

2020 May 12. doi: 10.1111/jrh.12462.

<https://onlinelibrary.wiley.com/doi/epdf/10.1111/jrh.12462>

Findings: Project ECHO is a telementoring education model that expands primary care clinicians' ability to manage complex health conditions. An interdisciplinary expert faculty, an "all teach, all learn" approach, and a combination of didactic and case-based learning characterize ECHO programs.

**26. Posttraumatic Stress Symptoms of Health Care Workers during the Corona Virus Disease 2019 (COVID-19).** Yin Q, Sun Z, Liu T, et al. *Clin Psychol Psychother*. 2020 May 15. doi:

10.1002/cpp.2477. <https://onlinelibrary.wiley.com/doi/abs/10.1002/cpp.2477>

Findings: 377 HCWs working in different provinces of China participated in the survey between February 1st and 5th. Results showed that one month after the outbreak, the prevalence of PTSS was 3.8% in HCWs. Female HCWs were more vulnerable to PTSS and HCWs with higher exposure level also significantly rated more hyper-arousal symptoms. There was a significant difference of sleep quality between participants with and without PTSS. In summary, targeted interventions on sleep contribute to the mental recovery during the outbreak of COVID-19.

**27. Analysis of the infection status of the health care workers in Wuhan during the COVID-19 outbreak: A cross-sectional study.** Zheng L, Wang X, Zhou C, et al. *Clin Infect Dis*. 2020 May 15:ciaa588. doi: 10.1093/cid/ciaa588.

<https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa588/5837357>

Findings: We have obtained the data on 2,457 infected cases among health care workers in Wuhan, China. More than half of the infected individuals were nurses (52.06%), while 33.62% of infected cases were doctors and 14.33% of cases were medical staff. In particular, the case infection rate of nurses (2.22%) was remarkably higher than that of doctors (1.92%). Most infected cases among health care workers were female (72.28%). A majority of the infected health care workers (89.26%) came from general hospitals, followed by specialized hospitals (5.70%) and community hospitals (5.05%). The case infection rate of health care workers (2.10%) was dramatically higher than that of non-health care workers (0.43%). The case fatality rate of health care workers (0.69%) was significantly lower than that of non-health care workers (5.30%).

**28. Where Are All the Patients? Addressing Covid-19 Fear to Encourage Sick Patients to Seek Emergency Care.** Wong LE, Hawkins JE, Murrell KL. *NEJM Catalyst Innovations in Care Delivery*. 2020 May 14. <https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0193>

Findings: Emergency department volume is down nearly 50% as the United States struggles with the Covid-19 epidemic. There is increasing evidence that patients with medical emergencies are avoiding the emergency department because of fear of contracting Covid-19, leading to increased morbidity and mortality. Here, the authors describe efforts taken in a community hospital to understand and combat this public health concern by using human-centered design. They show that addressing patient fears by dividing the emergency department into respiratory and non-respiratory pods and through targeted messaging can result in increased visits to the emergency room.

29. **Supporting adults bereaved through COVID-19: a rapid review of the impact of previous pandemics on grief and bereavement.** Mayland CR, Harding AJ, Preston N, Payne S. *J Pain Symptom Manage*. 2020 May 13. pii: S0885-3924(20)30388-2.

doi:10.1016/j.jpainsymman.2020.05.012.

[https://www.jpainjournal.com/article/S0885-3924\(20\)30388-2/fulltext](https://www.jpainjournal.com/article/S0885-3924(20)30388-2/fulltext)

Findings: This study aimed to review and synthesize learning from previous literature focused on the impact on grief and bereavement during other infectious disease outbreaks. No research studies have focused on outcomes and support for bereaved people during a pandemic. Studies have tended to focus on survivors i.e. those who had the illness and recovered, recognizing that some of these individuals will also be bereaved people. Previous pandemics appear to cause multiple losses both directly related to death itself but also in terms of disruption to social norms, rituals and mourning practices. In view of the limited research, specific learning from the current COVID-19 crisis and the impact on the bereaved would be pertinent. Current focus should include innovative ways to promote connection and adapt rituals while maintaining respect.

30. **Coronavirus (COVID-19): Patient experience-administrative services on the frontline during crisis.** Overton J, Denton K, Frumovitz M, et al. *Head Neck*. 2020 May 16. doi:

10.1002/hed.26259. <https://onlinelibrary.wiley.com/doi/full/10.1002/hed.26259?af=R>

Findings: At MD Anderson, the Division of Patient Experience has played an integral role in the institution's pandemic response from its inception. The team actively supported programs and processes in anticipation of the pandemic's effect on our patients and employees. We describe how the team continues to serve in the ever-dynamic environment as we approach the expected surge in COVID-19 cases among our patient population, our employees, and in our community.

### Prognosis

31. **Development and Validation of a Clinical Risk Score to Predict the Occurrence of Critical Illness in Hospitalized Patients With COVID-19.** Liang W, Liang H, Ou L, et al. *JAMA Intern Med*. May 12, 2020. doi:10.1001/jamainternmed.2020.2033

<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2766086>

Findings: In this study with a development cohort of 1590 patients and a validation cohort of 710 patients, a risk score was developed and validated to predict development of critical illness. We identified 10 independent predictors and developed a risk score (COVID-GRAM) that predicts development of critical illness. The risk score predictors included: chest radiography abnormality, age, hemoptysis, dyspnea, unconsciousness, number of comorbidities, cancer history, neutrophil-to-lymphocyte ratio, lactate dehydrogenase, and direct bilirubin.

32. **Risk Factors of Severe Disease and Efficacy of Treatment in Patients Infected with COVID-19: A Systematic Review, Meta-Analysis and Meta-Regression Analysis.** Zhang JJY, Lee KS, Ang LW, Leo YS, Young BE. *Clin Infect Dis*. 2020 May 14:ciaa576. doi: 10.1093/cid/ciaa576.

<https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa576/5837140>

Findings: We conducted a systematic review and meta-analysis of all published studies up to March 15, 2020 which reported COVID-19 clinical features and/or treatment outcomes. 45 studies reporting 4203 patients were included. Pooled rates of intensive care unit (ICU) admission, mortality and acute respiratory distress syndrome (ARDS) were 10.9%, 4.3% and 18.4%, respectively. On meta-regression, ICU admission was predicted by raised leukocyte count ( $p < 0.0001$ ), raised alanine aminotransferase ( $p = 0.024$ ), raised aspartate transaminase ( $p = 0.0040$ ), elevated lactate dehydrogenase (LDH) ( $p < 0.0001$ ) and increased procalcitonin ( $p < 0.0001$ ). ARDS was predicted by elevated LDH ( $p < 0.0001$ ), while mortality was predicted by raised leukocyte count ( $p = 0.0005$ ) and elevated LDH ( $p < 0.0001$ ). Treatment with lopinavir-ritonavir showed no significant benefit in mortality and ARDS rates. Corticosteroids were associated with a higher rate of ARDS ( $p = 0.0003$ ).

**33. Clinical and Chest Radiography Features Determine Patient Outcomes In Young and Middle Age Adults with COVID-19.** Toussie D, Voutsinas N, Finkelstein M, et al.

*Radiology*. 2020 May 14:201754. doi: 10.1148/radiol.2020201754.

<https://pubs.rsna.org/doi/10.1148/radiol.2020201754>

Findings: For patients aged 21-50 with COVID-19 presenting to the emergency department, a chest x-ray severity score was predictive of risk for hospital admission and intubation.

**34. Hypoalbuminemia predicts the outcome of COVID-19 independent of age and co-morbidity.**

Huang J, Cheng A, Kumar R, et al. *J Med Virol*. 2020 May 14. doi: 10.1002/jmv.26003.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/jmv.26003>

Results: Hypoalbuminemia was associated with the outcome of COVID-19. The potential therapeutic value of albumin infusion in COVID-19 should be further explored at the earliest.

**35. Longitudinal hematologic and immunologic variations associated with the progression of COVID-19 patients in China.** Chen R, Sang L, Jiang M, et al. *J Allergy Clin Immunol*. 2020 May 11:S0091-6749(20)30638-2. doi:10.1016/j.jaci.2020.05.003.

<https://www.jacionline.org/action/showPdf?pii=S0091-6749%2820%2930638-2>

Findings: Hematologic and immunologic impairment showed a significantly different profile between survivors and non-survivors in COVID-19 patients with different severity. The longitudinal variations of these biomarkers could serve to predict recovery or fatal outcome.

**36. Is diabetes mellitus associated with mortality and severity of COVID-19? A meta-analysis.**

Kumar A, Arora A, Sharma P, et al. *Diabetes Metab Syndr*. 2020 May 6;14(4):535-545. doi: 10.1016/j.dsx.2020.04.044.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7200339/>

Findings: Diabetes in patients with COVID-19 is associated with a two-fold increase in mortality as well as severity of COVID-19, as compared to non-diabetics. Further studies on the pathogenic mechanisms and therapeutic implications need to be done.

**37. Use of renin-angiotensin-aldosterone system inhibitors and risk of COVID-19 requiring admission to hospital: a case-population study.** de Abajo et al. *Lancet* 2020 May 14.

[https://doi.org/10.1016/S0140-6736\(20\)31030-8](https://doi.org/10.1016/S0140-6736(20)31030-8)

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)31030-8/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31030-8/fulltext)

Abstract: RAAS inhibitors do not increase the risk of COVID-19 requiring admission to hospital, including fatal cases and those admitted to intensive care units, and should not be discontinued to prevent a severe case of COVID-19.

## Therapeutics

**38. Use of Prone Positioning in Nonintubated Patients With COVID-19 and Hypoxemic Acute Respiratory Failure.** Elharrar X, Trigui Y, Dols A, et al. *JAMA*. May 15, 2020.

doi:10.1001/jama.2020.8255

<https://jamanetwork.com/journals/jama/fullarticle/2766292>

Findings: In this study of patients with COVID-19 and hypoxemic respiratory failure managed outside the ICU, 63% were able to tolerate PP for more than 3 hours. However, oxygenation increased during PP in only 25% and was not sustained in half of those after resupination. These results are consistent with findings from previous small studies of PP in nonintubated patients. A trial of PP may be a mechanism to select patients who will do well or it may be useful in a subset.

**39. Convalescent plasma or hyperimmune immunoglobulin for people with COVID-19: a rapid review.** Valk SJ, Piechotta V, Chai KL, Doree C, Monsef I, Wood EM, Lamikanra A, Kimber C, McQuilten Z, So-Osman C, Estcourt LJ, Skoetz N. *Cochrane Database Syst Rev*. 2020 May 14;5:CD013600. doi: 10.1002/14651858.CD013600.

<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD013600/full>

Findings: We identified eight studies with a total of 32 participants. Most studies assessed the risks of the intervention; reporting two adverse events (potentially grade 3 or 4), one of which was a serious adverse event. We are very uncertain whether convalescent plasma is effective for people admitted to hospital with COVID-19 as studies reported results inconsistently, making it difficult to compare results and to draw conclusions. There are 47 ongoing studies evaluating convalescent plasma, of which 22 are RCTs, and one trial evaluating hyperimmune immunoglobulin. We will update this review as a living systematic review, based on monthly searches in the above mentioned databases and registries.

**40. Compassionate remdesivir treatment of severe Covid-19 pneumonia in intensive care unit (ICU) and Non-ICU patients: Clinical outcome and differences in post-treatment hospitalisation status.** Antinori S, Cossu MV, Ridolfo AL, et al. *Pharmacol Res*. 2020 May

11:104899. doi: 10.1016/j.phrs.2020.104899.

<https://www.nejm.org/doi/full/10.1056/NEJMoa2007016>

Findings: Our data suggest that remdesivir can benefit patients with SARS-CoV-2 pneumonia hospitalised outside ICU where clinical outcome was better and adverse events are less frequently observed. Ongoing randomised controlled trials will clarify its real efficacy and safety, who to treat, and when.

41. **Efficacy and safety of corticosteroids in COVID-19 based on evidence for COVID-19, other coronavirus infections, influenza, community-acquired pneumonia and acute respiratory distress syndrome: a systematic review and meta-analysis.** Ye Z, Wang Y, Colunga-Lozano LE, et al. *CMAJ*. 2020 May 14;cmaj.200645. doi: 10.1503/cmaj.200645.

<https://www.cmaj.ca/content/cmaj/early/2020/05/14/cmaj.200645.full.pdf>

Findings: Corticosteroids may reduce mortality for patients with COVID-19 and ARDS. For patients with severe COVID-19 but without ARDS, evidence regarding benefit from different bodies of evidence is inconsistent and of very low quality.

### Transmission / Infection Control

42. **High SARS-CoV-2 Attack Rate Following Exposure at a Choir Practice — Skagit County, Washington, March 2020.** Lea Hamner, Polly Dubbel, Ian Capron, et al. *MMWR Morb Mortal Wkly Rep* 2020 May 15;69:606–610. DOI: <http://dx.doi.org/10.15585/mmwr.mm6919e6>

<https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e6.htm>

43. **Transmission of SARS-CoV-2 in Domestic Cats.** Sakai-Tagawa Y, Iwatsuki-Horimoto K, Imai M, Kawaoka Y. *NEJM* 2020 May 13. doi: 10.1056/NEJMc2013400

<https://www.nejm.org/doi/full/10.1056/NEJMc2013400>

Findings: SARS-CoV-2 inoculated cats can spread COVID-19 to uninoculated co-housed cats and may be asymptomatic. A better understanding of the role cats may play in the transmission of SARS-CoV-2 to humans is needed.

44. **The prevalence, characteristics, and related factors of pressure injury in medical staff wearing personal protective equipment against COVID-19 in China: A multicentre cross-sectional survey.** Jiang Q, Liu Y, Wei W, et al. *Int Wound J*. 2020 May 12. doi: 10.1111/iwj.13391.

<https://onlinelibrary.wiley.com/doi/full/10.1111/iwj.13391>

Findings: The overall prevalence of PI caused by PPE among medical staff was 30.03%. The prevalence of male was more than that of female (42.25% vs 26.36%). The categories were mainly stages 1 and 2, and the common anatomical locations were nose bridge, cheeks, ears, and forehead. Comprehensive preventive interventions should be taken.

45. **Use of SARS-CoV-2 infected deceased organ donors: Should we always "just say no?"** Kates OS, Fisher CE, Rakita RM, et al. *Am J Transplant*. 2020 May 12. doi: 10.1111/ajt.16000.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/ajt.16000>

Findings: In the context of a rapidly evolving pandemic, multiple organizations have released guidelines stating that all organs from potential deceased donors with SARS-CoV-2 infection should be deferred, including from otherwise medically eligible donors found to have mild or asymptomatic SARS-CoV-2 discovered on routine donor screening. We critically examine the available data on the risk of transmission of SARS-CoV-2 through organ transplantation. Data provide little evidence to suggest the presence of intact transmissible SARS-CoV in organs that can potentially be transplanted, specifically liver and heart. Other considerations including ethical, financial, societal, and logistical concerns are also addressed. We conclude that, for

selected patients with high waitlist mortality, transplant programs should consider accepting heart or liver transplants from deceased donors with SARS-CoV-2 infection.

46. **SARS-CoV-2-specific antibody detection in healthcare workers in Germany with direct contact to COVID-19 patients.** Korth J, Wilde B, Dolff S, et al. *J Clin Virol.* 2020 May 13:104437. doi: 10.1016/j.jcv.2020.104437. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7219425/>  
Findings: The overall seroprevalence of SARS-CoV-2 in healthcare workers of a tertiary hospital in Germany is low (1.6%). The data indicate that the local hygiene standard might be effective.

47. **Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff.** Verbeek JH, Rajamaki B, Ijaz S, et al. *Cochrane Database Syst Rev.* 2020 May 15;5:CD011621. doi: 10.1002/14651858.CD011621.pub5. <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD011621.pub4/full>  
Findings: We found low- to very low-certainty evidence that covering more parts of the body leads to better protection but usually comes at the cost of more difficult donning or doffing and less user comfort. More breathable types of PPE may lead to similar contamination but may have greater user satisfaction. Modifications to PPE design, such as tabs to grab, may decrease the risk of contamination. For donning and doffing procedures, following CDC doffing guidance, a one-step glove and gown removal, double-gloving, spoken instructions during doffing, and using glove disinfection may reduce contamination and increase compliance. Face-to-face training in PPE use may reduce errors more than folder-based training. We need simulation studies with more participants to find out which combinations of PPE and which doffing procedure protects best. The use of PPE of HCW exposed to highly infectious diseases should be registered and the HCW should be prospectively followed for their risk of infection.

48. **Factors associated with duration of viral shedding in adults with COVID-19 outside of Wuhan, China: A retrospective cohort study.** Qi L et al. *Int J Infect Dis* 2020 May 17. doi: <https://doi.org/10.1016/j.ijid.2020.05.045>  
[https://www.ijidonline.com/article/S1201-9712\(20\)30352-0/fulltext#%2520](https://www.ijidonline.com/article/S1201-9712(20)30352-0/fulltext#%2520)  
Findings: The median duration of viral shedding until negative detection of SARS-CoV-2 RNA was 17 days. Multivariable Logistic regression analysis indicated that high temperature at admission, time from symptom onset to admission and hospital length of stay were risk factors for prolonged duration of viral shedding.

## Women & Children

49. **Vertical Transmission of Severe Acute Respiratory Syndrome Coronavirus 2: A Systematic Review.** Yang Z, Liu Y. *Am J Perinatol.* 2020 May 13. doi: 10.1055/s-0040-1712161. <https://www.thieme-connect.com/products/ejournals/pdf/10.1055/s-0040-1712161.pdf>  
Findings: There is currently no direct evidence to support intrauterine vertical transmission of SARS-CoV-2. Additional RT-PCR tests on amniotic fluid, placenta, and cord blood are needed to ascertain the possibility of intrauterine vertical transmission. For pregnant women infected during their first and second trimesters, further studies focusing on long-term outcomes are needed.

50. **An outbreak of severe Kawasaki-like disease at the Italian epicentre of the SARS-CoV-2 epidemic: an observational cohort study.** Verdoni L, Mazza A, Gervasoni A, et al. *Lancet* 2020 May 13. doi: [https://doi.org/10.1016/S0140-6736\(20\)31103-X](https://doi.org/10.1016/S0140-6736(20)31103-X)  
[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)31103-X/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31103-X/fulltext)  
Findings: In the past month we found a 30-fold increased incidence of Kawasaki-like disease. Children diagnosed after the SARS-CoV-2 epidemic began showed evidence of immune response to the virus, were older, had a higher rate of cardiac involvement, and features of MAS. The SARS-CoV-2 epidemic was associated with high incidence of a severe form of Kawasaki disease.
51. **SARS-CoV-2 Infection of the Placenta.** Hosier H et al. *MedRxiv* 2020 May 12. doi: <https://doi.org/10.1101/2020.04.30.20083907> PREPRINT  
<https://www.medrxiv.org/content/10.1101/2020.04.30.20083907v3>  
Findings: This case demonstrates, for the first time, SARS-CoV-2 invasion of the placenta, highlighting the potential for severe morbidity among pregnant women with Covid-19.
52. **Outbreak of Kawasaki disease in children during COVID-19 pandemic: a prospective observational study in Paris, France.** Toubiana J, Poirault C, Corsia A, Bajolle F, Fourgeaud J, Angoulvant F, Debray A, Basmaci R, Salvador E, Biscardi S, Frange P, Chalumeau M, Casanova J-L, Cohen JF, Allali S. *MedRxiv* 2020.05.10.20097394; doi: <https://doi.org/10.1101/2020.05.10.20097394> PREPRINT  
<https://www.medrxiv.org/content/10.1101/2020.05.10.20097394v1>  
Findings: The ongoing outbreak of KD in the Paris might be related to SARS-CoV2, and shows an unusually high proportion of children with gastrointestinal involvement, KDSS and African ancestry.
53. **Probable Congenital SARS-CoV-2 Infection in a Neonate Born to a Woman with Active SARS-CoV-2 Infection.** Maksim Kirtsman, Yenge Diambomba, Susan M Poutanen, et al. *CMAJ* 2020 May 14;cmaj.200821. doi: 10.1503/cmaj.200821.  
<https://www.cmaj.ca/content/cmaj/early/2020/05/14/cmaj.200821.full.pdf>  
Findings: Our case represents a probable case of in utero SARSCoV-2 infection in a liveborn (via cesarean section) neonate. Congenital infection is supported by the following findings: the neonate was not in contact with vaginal secretions; the membranes were intact before birth; and there was no skin-to-skin contact with the mother before collection of the first neonatal nasopharyngeal swab.

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## GUIDELINES & CONSENSUS STATEMENTS

**Guidance and best practices for nuclear cardiology laboratories during the coronavirus disease 2019 (COVID-19) pandemic: An Information Statement from ASNC and SNMMI.** Skali H, Murthy VL, Al-Mallah MH, et al. *J Nucl Cardiol.* 2020 May 15. doi: 10.1007/s12350-020-02123-2.  
<https://zenodo.org/record/3827461#.XsQVvS-ZPUp>

**Tube thoracostomy during the COVID-19 pandemic: guidance and recommendations from the AAST Acute Care Surgery and Critical Care Committees.** Pieracci FM, Burlew CC, Spain D, et al. *Trauma Surg Acute Care Open*. 2020 Apr 30;5(1):e000498. doi: 10.1136/tsaco-2020-000498.  
<https://tsaco.bmj.com/content/5/1/e000498>

**Biosafety measures for preventing infection from COVID-19 in clinical laboratories: IFCC Taskforce Recommendations.** Lippi G, Adeli K, Ferrari M, Horvath AR, Koch D, Sethi S, Wang CB. *Clin Chem Lab Med*. 2020 May 12:/j/cclm.ahead-of-print/cclm-2020-0633/cclm-2020-0633.xml. doi: 10.1515/cclm-2020-0633.  
<https://www.degruyter.com/view/journals/cclm/ahead-of-print/article-10.1515-cclm-2020-0633/article-10.1515-cclm-2020-0633.xml>

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## FDA / CDC / NIH/ WHO Updates

CDC - [Multisystem Inflammatory Syndrome in Children \(MIS-C\) Associated with Coronavirus Disease 2019 \(COVID-19\)](#)

CDC - [CDC Activities and Initiatives Supporting the COVID-19 Response and the President's Plan for Opening America Up Again](#)

[FDA Informs Public About Possible Accuracy Concerns with Abbott ID NOW Point-of-Care Test](#)

FDA - [Certain Filtering Facepiece Respirators from China May Not Provide Adequate Respiratory Protection - Letter to Health Care Providers](#)

FDA - [Coronavirus \(COVID-19\) Update: FDA Authorizes First Standalone At-Home Sample Collection Kit That Can Be Used With Certain Authorized Tests](#)

NIH - [Investigational ChAdOx1 nCoV-19 vaccine protects monkeys against COVID-19 pneumonia](#)

WHO - [Multisystem inflammatory syndrome in children and adolescents with COVID-19](#)

WHO - [Cleaning and disinfection of environmental surfaces in the context of COVID-19](#)

WHO - [Case Report Form for suspected cases of Multisystem inflammatory syndrome \(MIS\) in children and adolescents temporally related to COVID-19](#)

WHO - [Laboratory biosafety guidance related to coronavirus disease \(COVID-19\)](#)

WHO - ["Solidarity" clinical trial for COVID-19 treatments](#)

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## Commentary

**US primary health care can be cheaper and more equal. Here's how - Amy Compton-Phillips**

<https://www.cnn.com/2020/05/17/opinions/primary-health-care-cheaper-compton-phillips/index.html>

**The New Normal: Key Considerations for Effective Serious Illness Communication over Video or Telephone during the Coronavirus Disease 2019 (COVID-19) Pandemic**

<https://www.acpjournals.org/doi/10.7326/M20-1982>

**An Ethical Framework for Allocating Scarce Inpatient Medications for COVID-19 in the US**

<https://jamanetwork.com/journals/jama/fullarticle/2766294>

**A Beacon for Dark Times: Palliative Care Support during the Coronavirus Pandemic**

<https://catalyst.nejm.org/doi/pdf/10.1056/CAT.20.0204>

**Preventing a Parallel Pandemic - A National Strategy to Protect Clinicians' Well-Being**

<https://www.nejm.org/doi/full/10.1056/NEJMp2011027>

**CIDRAP Viewpoint: Part 2 - Effective COVID-19 Crisis Communication**

<https://www.cidrap.umn.edu/sites/default/files/public/downloads/cidrap-covid19-viewpoint-part2.pdf>

**School Reopening - the Pandemic Issue that is not Getting its Due**

<https://jamanetwork.com/journals/jamapediatrics/fullarticle/2766113>

**UN Policy Brief: COVID-19 and the Need for Action on Mental Health**

[https://www.un.org/sites/un2.un.org/files/un\\_policy\\_brief-covid\\_and\\_mental\\_health\\_final.pdf](https://www.un.org/sites/un2.un.org/files/un_policy_brief-covid_and_mental_health_final.pdf)

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