COVID-19 Resource Desk

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New Research

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

COVID-19 related publications by Providence caregivers – see Digital Commons

Basic Science / Virology / Pre-clinical

1. **ACE2 (Angiotensin-Converting Enzyme 2) in Cardiopulmonary Diseases: Ramifications for the Control of SARS-CoV-2.** Sharma RK, Stevens BR, Obukhov AG, et al. *Hypertension*. 2020 Sep;76(3):651-661. doi: 10.1161/HYPERTENSIONAHA.120.15595. Epub 2020 Aug 12. https://www.ahajournals.org/doi/full/10.1161/HYPERTENSIONAHA.120.15595
Findings: Discovery of ACE2 (angiotensin-converting enzyme 2) revealed that the renin-angiotensin system has 2 counterbalancing arms. ACE2 is a major player in the protective arm, highly expressed in lungs and gut with the ability to mitigate cardiopulmonary diseases such as inflammatory lung disease. ACE2 also exhibits activities involving gut microbiome, nutrition, and as a chaperone stabilizing the neutral amino acid transporter, B0AT1, in gut. This review describes the discovery of ACE2, its physiological functions, and its place in the renin-angiotensin system. It illustrates new analyses of the structure of ACE2 that provides better understanding of its actions particularly in lung and gut, shedding of ACE2 by ADAM17 (a disintegrin and metallopeptidase domain 17 protein), and role of TMPRSS2 (transmembrane serine proteases 2) in severe acute respiratory syndrome coronavirus-2 entry into host cells. Cardiopulmonary diseases are associated with decreased ACE2 activity and the mitigation by increasing ACE2 activity along with its therapeutic relevance are addressed. Finally, the potential use of ACE2 as a treatment target in COVID-19, despite its role to allow viral entry into host cells, is suggested.

Clinical Syndrome

2. **Sex differences in immune responses that underlie COVID-19 disease outcomes.** Takahashi, T., Ellingson, M.K., Wong, P. et al. *Nature* August 26, 2020. https://doi.org/10.1038/s41586-020-2700-3
Findings: We focused our analysis on patients with moderate disease who had not received immunomodulatory medications, our results revealed that male patients had higher plasma levels of innate immune cytokines such as IL-8 and IL-18 along with more robust induction of non-classical monocytes. In contrast, female patients mounted significantly more robust T cell activation than male patients during SARS-CoV-2 infection, which was sustained in old age.

Importantly, we found that a poor T cell response negatively correlated with patients' age and was associated with worse disease outcome in male patients, but not in female patients. Conversely, higher innate immune cytokines in female patients associated with worse disease progression, but not in male patients. These findings reveal a possible explanation underlying observed sex biases in COVID-19 and provide an important basis for the development of a sex-based approach to the treatment and care of men and women with COVID-19.

3. **Underlying Vulnerabilities to the Cytokine Storm and Adverse COVID-19 Outcomes in the Aging Immune System.** Nidadavolu L, Walston J. *J Gerontol A Biol Sci Med Sci*. 2020 Aug 25:glaa209. doi: 10.1093/gerona/glaa209.
https://academic.oup.com/biomedgerontology/advance-article/doi/10.1093/gerona/glaa209/5897028
Findings: Older adults are far more vulnerable to adverse health outcomes and mortality after contracting COVID-19. TThis article provides an overview of the underlying etiologies of innate immune system activation and adaptive immune system dysregulation in older adults and how they potentiate the consequences of the COVID-19 related cytokine storm, and possible uses of this knowledge to develop better risk assessment and treatment monitoring strategies.

4. **Prevalence of asymptomatic deep vein thrombosis in patients hospitalized with SARS-CoV-2 pneumonia: a cross-sectional study.** Giorgi-Pierfranceschi M, Paoletti O, Pan A, et al. *Intern Emerg Med*. 2020 Aug 25. doi: 10.1007/s11739-020-02472-3.
https://link.springer.com/article/10.1007/s11739-020-02472-3
Findings: We assessed the association between COVID-19 infection-related pneumonia and proximal DVT in a cohort of patients admitted to our hospital during the European outbreak in the front line of Cremona, Lombardy. In a single-center cross-sectional study, all patients hospitalized for more than 5 days in Internal Medicine Department with confirmed COVID-19 pneumonia received 2-point compressive ultrasound assessment (CUS) of the leg vein system during a single day. Ninety-four percent of patients received enoxaparin as standard pharmacological prophylaxis for venous thromboembolism. Out of 121 patients with COVID-19 pneumonia the presence of asymptomatic DVT was found in 9 patients (13.6%). No symptomatic DVT was found. Patients with DVT showed mean age = 75.7 years, mean D-dimer levels = 4.02 ng/ml and all of them received enoxaparin for thromboprophylaxis, except one. Computed tomography pulmonary angiogram confirmed pulmonary embolism in five patients. One every seven patients with COVID-19-related pneumonia, hospitalized for more than 5 days, had asymptomatic proximal DVT and half of them had confirmed PE despite standard pharmacological thromboprophylaxis. This observational study suggests the need of an active surveillance through CUS in patients hospitalized with acute SARS-COV-2 and underline the need of a more intense thromboprophylaxis.

5. **Guillain-Barré syndrome spectrum associated with COVID-19: an up-to-date systematic review of 73 cases.** Abu-Rumeileh S, Abdelhak A, Foschi M, Tumani H, Otto M. *J Neurol*. 2020 Aug 25. doi: 10.1007/s00415-020-10124-x.
https://link.springer.com/article/10.1007%2Fs00415-020-10124-x

Findings: We included 73 patients reported in 52 publications. A broad age range was affected (mean 55, min 11-max 94 years) with male predominance (68.5%). Most patients showed respiratory and/or systemic symptoms and developed GBS manifestations after COVID-19. However, asymptomatic cases for COVID-19 were also described. More than 70% of patients showed a good prognosis, mostly after treatment with intravenous immunoglobulin. Patients with less favorable outcome were associated with a significantly older age in accordance with previous findings regarding both classic GBS and COVID-19. COVID-19-associated GBS seems to share most features of classic post-infectious GBS and possibly the same immune-mediated pathogenetic mechanisms.

6. **Syncope and presyncope in patients with COVID-19.** Oates C, Turagam MK, Musikantow D, et al. *Pacing Clin Electrophysiol.* 2020 Aug 25. doi: 10.1111/pace.14047. https://onlinelibrary.wiley.com/doi/10.1111/pace.14047
RESULTS: Among 1,000 COVID-19 patients admitted to the Mount Sinai Hospital, the incidence of syncope/presyncope was 3.7%. The median age of the entire cohort was 69 years (range 26 - 89+ years) and 55% were men. Syncope/presyncope in patients hospitalized with COVID-19 is uncommon and is infrequently associated with a cardiac etiology nor associated with adverse outcomes compared to those who do not present with these symptoms.

7. **Cardiogenic Shock and Hyperinflammatory Syndrome in Young Males with COVID-19.** Chau VQ, Giustino G, Mahmood K, et al. *Circ Heart Fail*. 2020 Aug 26. doi: 10.1161/CIRCHEARTFAILURE.120.007485. https://www.ahajournals.org/doi/pdf/10.1161/CIRCHEARTFAILURE.120.007485
Findings: The primary manifestations of COVID-19 in our patients were new-onset biventricular failure and vasoplegia that progressed to shock with multiorgan dysfunction. Strikingly, all patients were young males without baseline cardiovascular risk factors.

8. **Clinical features, diagnostics, and outcomes of patients presenting with acute respiratory illness: A retrospective cohort study of patients with and without COVID-19.** Shah SJ, Barish PN, Prasad PA, et al. *EClinicalMedicine*. 2020 Aug 26:100518. doi: 10.1016/j.eclinm.2020.100518.   https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(20)30262-5/fulltext
Findings: While we found differences in clinical features of COVID-19 compared to other acute respiratory illnesses, there was significant overlap in presentation and comorbidities. Patients with COVID-19 were more likely to be admitted to the hospital, have longer hospitalizations and develop ARDS, and were unlikely to have co-existent viral infections.

9. **Pathophysiology of COVID-19-associated acute respiratory distress syndrome: a multicentre prospective observational study.** Grasselli G, Tonetti T, Protti A, et al. *Lancet Respir Med.* 2020 Aug 27:S2213-2600(20)30370-2. doi: 10.1016/S2213-2600(20)30370-2 https://www.sciencedirect.com/science/article/pii/S2213260020303702?via%3Dihub
Findings: Patients with COVID-19-associated ARDS have a form of injury that, in many aspects, is similar to that of those with ARDS unrelated to COVID-19. Notably, patients with COVID-19-

related ARDS who have a reduction in respiratory system compliance together with increased D-dimer concentrations have high mortality rates.

Diagnostics & Screening

10. **Saliva sample pooling for the detection of SARS-CoV-2.** Pasomsub E, Watcharananan SP, Watthanachockchai T, et al. *J Med Virol*. 2020 Aug 25. doi: 10.1002/jmv.26460. https://onlinelibrary.wiley.com/doi/abs/10.1002/jmv.26460
Findings: Recently we showed that saliva could be a potential alternative specimen for the detection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by real-time polymerase chain reaction (RT-PCR). In the present study, we performed the pooling of saliva specimens for testing by SARS-CoV-2 RT-PCR. We showed that the saliva pool of either five or ten samples, by allowing the detection of either gene in the pool at an increased cycle threshold cut-off value, further performing individual sample testing in the positive pools did not compromise the detection of SARS-CoV-2.

11. **Rapid, point-of-care antigen and molecular-based tests for diagnosis of SARS-CoV-2 infection.** Dinnes J, Deeks JJ, Adriano A, et al. *Cochrane Database Syst Rev.* 2020 Aug 26;8:CD013705. doi: 10.1002/14651858.CD013705.
https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD013705/full
Findings: This review identifies early-stage evaluations of point-of-care tests for detecting SARS-CoV-2 infection, largely based on remnant laboratory samples. The findings currently have limited applicability, as we are uncertain whether tests will perform in the same way in clinical practice, and according to symptoms of COVID-19, duration of symptoms, or in asymptomatic people. Rapid tests have the potential to be used to inform triage of RT-PCR use, allowing earlier detection of those testing positive, but the evidence currently is not strong enough to determine how useful they are in clinical practice. Prospective and comparative evaluations of rapid tests for COVID-19 infection in clinically relevant settings are urgently needed. Studies should recruit consecutive series of eligible participants, including both those presenting for testing due to symptoms and asymptomatic people who may have come into contact with confirmed cases. Studies should clearly describe symptomatic status and document time from symptom onset or time since exposure. Point-of-care tests must be conducted on samples according to manufacturer instructions for use and be conducted at the point of care.

12. **Pooling Upper Respiratory Specimens for Rapid Mass Screening of COVID-19 by Real-Time RT-PCR.** Kim SY, Lee J, Sung H, et al. *Emerg Infect Dis.* 2020 Aug 26;26(10). doi: 10.3201/eid2610.201955. https://wwwnc.cdc.gov/eid/article/26/10/20-1955_article
Findings: To validate the specimen-pooling strategy for real-time reverse transcription PCR detection of severe acute respiratory syndrome coronavirus 2, we generated different pools including positive specimens, reflecting the distribution of cycle threshold values at initial diagnosis. Cumulative sensitivities of tested pool sizes suggest pooling of <6 specimens for surveillance by this method.

13. **A novel two-step, direct-to-PCR method for virus detection off swabs using human coronavirus 229E.** Morehouse ZP, Proctor CM, Ryan GL, Nash RJ. *Virol J.* 2020 Aug 25;17(1):129. doi: 10.1186/s12985-020-01405-y. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7445803/
Findings: HCoV-229E in vitro spiked swabs were processed in a novel two-step, direct-to-PCR methodology for viral detection. After running 54 swabs, we confidently determined our limit of detection to be 1.2×10^3 viral copies/mL with 96.30% sensitivity. We have proven that the shaker-mill homogenization-based two-step, direct-to-PCR procedures provides sufficient viral lysis off swabs, where the resulting lysate can be used directly in PCR for the detection of HCoV-229E. This finding allows for reductions in the time and resources required for PCR based virus detection in comparison to the traditional extraction-to-PCR methodology.

14. **Clinical, immunological and virological characterization of COVID-19 patients that test re-positive for SARS-CoV-2 by RT-PCR.** Lu J, Peng J, Xiong Q, et al. *EBioMedicine*. 2020 Aug 24;59:102960. doi: 10.1016/j.ebiom.2020.102960. https://www.thelancet.com/journals/ebiom/article/PIIS2352-3964(20)30336-4/fulltext
FINDINGS: Among 619 discharged COVID-19 cases, 87 re-tested as SARS-CoV-2 positive in circumstances of social isolation. All re-positive cases had mild or moderate symptoms at initial diagnosis and were younger on average (median, 28). Re-positive cases (n = 59) exhibited similar neutralization antibodies (NAbs) titre distributions to other COVID-19 cases (n = 218) tested here. No infectious strain could be obtained by culture and no full-length viral genomes could be sequenced from re-positive cases. Re-positive SARS-CoV-2 cases do not appear to be caused by active reinfection and were identified in ~14% of discharged cases. A robust NAb response and potential virus genome degradation were detected in almost all re-positive cases, suggesting a substantially lower transmission risk, especially through respiratory routes.

15. **COVID-19 and cancer: A guide with suggested COVID-19 rule-out criteria to support clinical decision-making.** Larson C, Oronsky B, Goyal S, Ray C, Hammond TC, Santosh Kesari, et al [***PSJH authors***]. *Biochim Biophys Acta Rev Cancer*. 2020 Aug 20;188412. doi: 10.1016/j.bbcan.2020.188412. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7438345/
Findings: This review summarizes the current understanding of the transmission, clinical presentation, diagnosis and differential diagnosis, pathogenesis, rationale to treat the cancer or not, treatment and prevention of COVID-19 with an emphasis on implications in cancer. Potential COVID-19 rule out criteria, based on the Wells' criteria for pulmonary embolism, another protean disease entity, are provided as a decision-making aid.

16. **Saliva or Nasopharyngeal Swab Specimens for Detection of SARS-CoV-2.** Wyllie AL, Fournier J, Casanovas-Massana A, et al. *N Engl J Med*. 2020 Aug 28. doi: 10.1056/NEJMc2016359. https://tinyurl.com/y4ytxkh9
Findings: We tested saliva specimens collected by the patients themselves and nasopharyngeal swabs collected from the patients at the same time point by health care workers. Our findings suggest that saliva specimens and nasopharyngeal swab specimens have at least similar sensitivity in the detection of SARS-CoV-2 during the course of hospitalization. Given the growing need for testing, our findings provide support for the potential of saliva specimens in the diagnosis of SARS-CoV-2 infection.

See also: **Salivary Detection of COVID-19.** Caulley L, Corsten M, Eapen L, et al. *Ann Intern Med.* 2020 Aug 28. doi: 10.7326/M20-4738.

17. **Evaluation of SARS-CoV-2 serology assays reveals a range of test performance.** Whitman JD, Hiatt J, Mowery CT, Shy BR, et al. *Nat Biotechnol*. 2020 Aug 27. doi: 10.1038/s41587-020-0659-0. https://www.nature.com/articles/s41587-020-0659-0

    Findings: We conducted a head-to-head evaluation of ten point-of-care-style lateral flow assays (LFAs) and two laboratory-based enzyme-linked immunosorbent assays to detect anti-SARS-CoV-2 IgM and IgG antibodies in 5-d time intervals from symptom onset and studied the specificity of each assay in pre-coronavirus disease 2019 specimens. The percent of seropositive individuals increased with time, peaking in the latest time interval tested (>20 d after symptom onset). Test specificity ranged from 84.3% to 100.0% and was predominantly affected by variability in IgM results. LFA specificity could be increased by considering weak bands as negative, but this decreased detection of antibodies (sensitivity) in a subset of SARS-CoV-2 real-time PCR-positive cases. Our results underline the importance of seropositivity threshold determination and reader training for reliable LFA deployment. Although there was no standout serological assay, four tests achieved more than 80% positivity at later time points tested and more than 95% specificity.

Epidemiology & Public Health

18. **Longitudinal SARS-CoV-2 serosurveillance of over ten thousand health care workers in the Providence Oregon cohort.** Rom Leidner, Angi Frary, Julie Cramer, David Ball, Roshanthi Weerasinghe, Mark Schmidt, Justin Jin, Veronica Luzzi, Alec Saitman, Jeffrey A. Young, David Leidner, Kendall Sawa, Scott Marsal, Kevin Olson, Nancy Frisco, Amy Compton-Phillips, Walter Urba, Brian Piening, Carlo Bifulco [**PSJH authors**] *medRxiv PREPRINT*. August 18, 2020. doi: https://doi.org/10.1101/2020.08.16.20176107 https://www.medrxiv.org/content/10.1101/2020.08.16.20176107v1

    Findings: Here we present results from a large serosurveillance study of 10,019 asymptomatic HCW conducted during April-May 2020, in eight hospital medical centers across the state of Oregon, USA during the initial peak of the pandemic. We identified 253 SARS-CoV-2 IgG seropositive individuals among 10,019 total participants, representing a cross-sectional seroprevalence of 2.53%. Over the course of the study, 17 seroconversions (0.25%) and 101 seroreversions (1.50%) were identified. Overall, these findings demonstrate relatively low seroprevalence and very low seroconversion rates among HCW in Oregon, USA, when aggressive social distancing measures were in place. The high rate of seroreversion observed and the relatively high discordance between SARS-CoV-2 serology and swab qPCR, highlight limitations of current detection methods, and stress the need for development of novel assessment methodologies to more accurately identify exposure (and/or immunity) to SARS-CoV-2 in this population.

19. **The Association between Influenza and Pneumococcal Vaccinations and SARS-Cov-2 Infection: Data from the EPICOVID19 Web-Based Survey.** Noale M, Trevisan C, Maggi S, et al. *Vaccines*

(Basel). 2020 Aug 23;8(3):E471. doi: 10.3390/vaccines8030471. https://www.mdpi.com/2076-393X/8/3/471

Findings: The present study aims to evaluate whether influenza and pneumococcal vaccinations are associated with positive nasopharyngeal swab (NPS) testing to detect SARS-CoV-2. Data from the Italian cross-sectional web-based survey (EPICOVID19), based on a self-selection sample of individuals aged ≥18, were considered. The probability of a positive SARS-CoV-2 NPS test result as a function of influenza or anti-pneumococcal vaccination was evaluated using multivariable logistic regression, stratifying analysis by age (<65 years, ≥65 years). From April 2020, 170,731 individuals aged <65 years and 28,097 ≥65 years filled out the EPICOVID19 questionnaire. Influenza and anti-pneumococcal vaccinations were received, respectively, by 16% and 2% of those <65 years, and by 53% and 13% of those ≥65 years. SARS-CoV-2 NPS testing was reported by 6680 participants. Anti-pneumococcal and influenza vaccinations were associated with a decreased probability of a SARS-CoV-2 NPS positive test in the younger participants (OR = 0.61, 95% CI 0.41-0.91; OR = 0.85, 95%CI 0.74-0.98; respectively). A significantly lower probability of a positive test result was detected in the individuals ≥65 years who received anti-pneumococcal vaccination (OR = 0.56, 95%CI 0.33-0.95). These results need to be confirmed by further investigations, but they are relevant given the probable coexistence of influenza, bacterial infections, and COVID-19 over the coming autumn-winter season.

20. **COVID-19 among American Indian and Alaska Native Persons - 23 States, January 31-July 3, 2020.** Hatcher SM, Agnew-Brune C, Anderson M, et al. *MMWR Morb Mortal Wkly Rep*. 2020 Aug 28;69(34):1166-1169. doi: 10.15585/mmwr.mm6934e1. https://www.cdc.gov/mmwr/volumes/69/wr/mm6934e1.htm

Findings: Although non-Hispanic American Indian and Alaska Native (AI/AN) persons account for 0.7% of the U.S. population,* a recent analysis reported that 1.3% of coronavirus disease 2019 (COVID-19) cases reported to CDC with known race and ethnicity were among AI/AN persons. To assess the impact of COVID-19 among the AI/AN population, reports of laboratory-confirmed COVID-19 cases during January 22†-July 3, 2020 were analyzed. Among 340,059 cases with complete patient race/ethnicity data, the cumulative incidence among AI/AN persons in these 23 states was 594 per 100,000 AI/AN population, compared with 169 per 100,000 white population. AI/AN persons with COVID-19 were younger than were white persons. More complete case report data and timely, culturally responsive, and evidence-based public health efforts that leverage the strengths of AI/AN communities are needed to decrease COVID-19 transmission and improve patient outcomes.

21. **Seroprevalence of SARS-CoV-2 Among Frontline Health Care Personnel in a Multistate Hospital Network — 13 Academic Medical Centers, April–June 2020.** Self WH, Tenforde MW, Stubblefield WB, et al. *MMWR Morb Mortal Wkly Rep.* 31 August 2020. DOI: http://dx.doi.org/10.15585/mmwr.mm6935e2external icon https://www.cdc.gov/mmwr/volumes/69/wr/mm6935e2.htm?s_cid=mm6935e2_w

Findings: Little is known about the prevalence and features of SARS-CoV-2 infection among frontline U.S. health care personnel. Among 3,248 personnel observed, 6% had antibody evidence of previous SARS-CoV-2 infection; 29% of personnel with SARS-CoV-2 antibodies were asymptomatic in the preceding months, and 69% had not previously received a diagnosis of

SARS-CoV-2 infection. Prevalence of SARS-CoV-2 antibodies was lower among personnel who reported always wearing a face covering while caring for patients (6%), compared with those who did not (9%). A high proportion of SARS-CoV-2 infections among health care personnel appear to go undetected. Universal use of face coverings and lowering clinical thresholds for testing could be important strategies for reducing hospital transmission.

22. **Increased Risk of COVID-19 Among Users of Proton Pump Inhibitors.** Almario CV, Chey WD, Spiegel BMR. *Am J Gastroenterol*. 2020 Aug 25. doi: 10.14309/ajg.0000000000000798. https://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=ovft&AN=00000434-900000000-99161&PDF=y
Findings: Of 53,130 participants, 3,386 (6.4%) reported a positive COVID-19 test. In regression analysis, individuals using PPIs up to once daily or twice daily had significantly increased odds for reporting a positive COVID-19 test when compared with those not taking PPIs. Individuals taking histamine-2 receptor antagonists were not at elevated risk. These findings emphasize good clinical practice that PPIs should only be used when indicated at the lowest effective dose, such as the approved once-daily label dosage of over-the-counter and prescription PPIs.

23. **Household transmission of COVID-19-a systematic review and meta-analysis.** Lei H, Xu X, Xiao S, Wu X, Shu Y. *J Infect*. 2020 Aug 25:S0163-4453(20)30571-5. doi: 10.1016/j.jinf.2020.08.033. https://www.journalofinfection.com/article/S0163-4453(20)30571-5/fulltext
Findings: Infection risk of household contacts is 10 times higher than other contacts. • Risk of household transmission in adults is about 3-times higher than that in children. • SARS-CoV-2 is much more transmissible than SARS-CoV and Middle East Respiratory Syndrome Coronavirus in households, which challenges the home isolation of COVID-19 patients.

24. **Cell Phone Activity in Categories of Places and Associations with Growth in Cases of COVID-19 in the US.** Sehra ST, George M, Wiebe DJ, et al. *JAMA Intern Med*. August 31, 2020. doi:10.1001/jamainternmed.2020.4288 https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/10.1001/jamainternmed.2020.4288
Findings: This cohort study incorporated publicly available county-level daily COVID-19 case data from January 22, 2020, to May 11, 2020, and county-level daily cell phone location data made publicly available by Google. It examined the daily cases of COVID-19 per capita and daily estimates of cell phone activity compared with the baseline (where baseline was defined as the median value for that day of the week from a 5-week period between January 3 and February 6, 2020). All days and counties with available data after the initiation of stay-at-home orders for each state were included. Our findings support the hypothesis that greater reductions in cell phone activity in the workplace and retail locations, and greater increases in activity at the residence, are associated with lesser growth in COVID-19 cases. These data provide support for the value of monitoring cell phone location data to anticipate future trends of the pandemic.

Healthcare Delivery & Healthcare Workers

25. **Managing Care Transitions to the Community During a Pandemic.** Landor M, Schroeder K, Thompson TK. *J Nurs Adm*. 2020 Sep;50(9):438-441. doi: 10.1097/NNA.0000000000000913. https://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00005110-202009000-00002&D=ovft&PDF=y
Findings: This column discusses the establishment of a multidisciplinary model for care transition of COVID-19-positive patients from hospital to community. The pandemic has presented challenging issues for discharge transition. A tiered patient identification and clinical messaging referral system was developed. The use of the COVID-19 transition model provided support to patients and physicians during the 30-day discharge period and can serve as a model for emerging public health issues in the future.

26. **International electronic health record-derived COVID-19 clinical course profiles: the 4CE consortium.** Brat GA, Weber GM, Gehlenborg N, et al. *NPJ Digit Med*. 2020 Aug 19;3:109. doi: 10.1038/s41746-020-00308-0. https://www.nature.com/articles/s41746-020-00308-0
Findings: We leveraged electronic health record data to address critical clinical and epidemiological questions about COVID-19. To do this, we formed an international consortium (4CE) of 96 hospitals across five countries (www.covidclinical.net). Contributors utilized the Informatics for Integrating Biology and the Bedside (i2b2) or Observational Medical Outcomes Partnership (OMOP) platforms to map to a common data model. The group focused on temporal changes in key laboratory test values. Harmonized data were analyzed locally and converted to a shared aggregate form for rapid analysis and visualization of regional differences and global commonalities. Data covered 27,584 COVID-19 cases with 187,802 laboratory tests. Case counts and laboratory trajectories were concordant with existing literature. Laboratory tests at the time of diagnosis showed hospital-level differences equivalent to country-level variation across the consortium partners. Despite the limitations of decentralized data generation, we established a framework to capture the trajectory of COVID-19 disease in patients and their response to interventions.

Laboratory Results

27. **Peripheral CD4+ T cell subsets and antibody response in COVID-19 convalescent individuals.** Gong F, Dai Y, Zheng T, et al. *J Clin Invest*. 2020 Aug 25:141054. doi: 10.1172/JCI141054. https://www.jci.org/articles/view/141054
Findings: We observed that relative to healthy individuals, convalescent patients displayed an altered peripheral CD4+ T cell spectrum. Specifically, consistent with other viral infections, cTFH1 cell associated with SARS-CoV-2 targeting antibodies, which was found to skew with disease severity as more severe individuals showed higher frequency of TEM and TFH-EM cells but a lower frequency of TCM, TFH-CM and TNaive cells, relative to mild and moderate patients. Interestingly, higher frequency of cTFH-EM cells correlated with lower number of recorded admission blood oxygen level in convalescent patients. These observations might constitute residual effects by which COVID-19 can impact the homeostasis of CD4+ T cells in the long-term and explain the highest ratio of class-switched virus-specific antibody producing individuals found in our severe COVID-19 cohort. Together, our study demonstrated close connection between CD4+ T cells and antibody production in COVID-19 convalescents.

28. **Antibody Profiles According to Mild or Severe SARS-CoV-2 Infection, Atlanta, Georgia, USA, 2020.** Hu WT, Howell JC, Ozturk T, et al. *Emerg Infect Dis.* 2020 Aug 28;26(12). doi: 10.3201/eid2612.203334. https://wwwnc.cdc.gov/eid/article/26/12/20-3334_article
Findings: Among patients with coronavirus disease (COVID-19), IgM levels increased early after symptom onset for those with mild and severe disease, but IgG levels increased early only in those with severe disease. A similar pattern was observed in a separate serosurveillance cohort. Mild COVID-19 should be investigated separately from severe COVID-19.

Prognosis

29. **Chest CT findings related to mortality of patients with COVID-19: A retrospective case-series study.** Hu Y, Zhan C, Chen C, Ai T, Xia L. *PLoS One*. 2020 Aug 25;15(8):e0237302. doi: 10.1371/journal.pone.0237302. eCollection 2020.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0237302
Findings: Chest CT findings and laboratory test results were worsening in patients who died of COVID-19, with moderate positive correlations between CT severity scores and inflammation-related factors of leucocytes, neutrophils, and IL-2R. Chest CT imaging may play an more important role in monitoring disease progression and predicting prognosis.

30. **Prevalence of pulmonary embolism in patients with COVID-19 pneumonia and high D-dimer values: A prospective study.** Alonso-Fernández A, Toledo-Pons N, Cosío BG, et al. *PLoS One*. 2020 Aug 25;15(8):e0238216. doi: 10.1371/journal.pone.0238216. eCollection 2020.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0238216
Findings: Thirty consecutive patients (11 women) were included. PE was diagnosed in 15 patients (50%). In patients with PE, emboli were located mainly in segmental arteries (86%) and bilaterally (60%). Patients with PE were significantly older and did not differ in sex or risk factors for thromboembolic disease from the non-PE group. D-dimer, platelet count, and, C reactive protein values were significantly higher among PE patients. D-dimer values correlated with the radiologic magnitude of PE (p<0.001). We consider that these findings could contribute to improve the prognosis of patients with COVID-19 pneumonia, by initiating anticoagulant therapy when a PE is found.

31. **Severe Coronavirus disease 2019 pneumonia patients showed signs of aggravated renal impairment.** Gao M, Wang Q, Wei J, Zhu Z, Li H. *J Clin Lab Anal*. 2020 Aug 25:e23535. doi: 10.1002/jcla.23535. https://onlinelibrary.wiley.com/doi/10.1002/jcla.23535
Findings: Severe COVID-19 patients had higher levels of urea and Pro, while their UA levels were lower, reflecting poor kidney function in severe patients. However, higher levels of hs-CRP, ESR indicated that inflammatory responses were more active in severe patients.

32. **Clinical characteristics, therapeutic management, and prognostic factors of adult COVID-19 inpatients with hematological malignancies.** Wu Y, Chen W, Li W, et al. *Leuk Lymphoma*. 2020 Aug 25:1-11. doi: 10.1080/10428194.2020.1808204.
https://www.tandfonline.com/doi/full/10.1080/10428194.2020.1808204

Findings: We retrospective summarized clinical characteristics of COVID-19 inpatients with hematological malignancies, shared treatment experiences, and analysis prognostic factors. Fourteen patients were enrolled. The median duration of viral shedding was 27.5 days in survivors. The median duration of time to death was 13 days in non-survivors. Non-survivors tend to present lower neutrophil count, more imaging finding of bilateral diffuse patch opacities, more undergoing intensive chemotherapy or immunosuppression. Laboratory and image findings were atypical and diverse. COVID-19 inpatients undergoing intensive chemotherapy or immunosuppression might have increased risk of death. The diagnostic value of specific antibody detection is limited. Therefore, adult COVID-19 inpatients with hematological malignancies present atypical, severe symptoms, decreased virus clearance ability, abnormal antibody response and poor outcome. During the epidemic, the pros and cons need to be carefully weighed while selecting the treatment methods.

33. **Antibody Responses and Clinical Outcomes in Adults Hospitalized with Severe COVID-19: A Post hoc Analysis of LOTUS China Trial.** Ren L, Fan G, Wu W, et al. *Clin Infect Dis*. 2020 Aug 25:ciaa1247. doi: 10.1093/cid/ciaa1247. https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa1247/5896896
Findings: After day 28 post symptoms onset, the rate of antibody positivity reached 100% for RBD-IgM, 97.8% for S-IgM, 100% for N-IgG, 100% for RBD-IgG, 91.1% for N-IgM and 91.1% for NAbs. The NAbs titers increased over time in both survivors and non-survivors and correlated to IgG antibodies against N, S and RBD, while its presence showed no statistical correlation with death. N-IgG (slope -2.11, 95% CI -3.04 to -1.18, p&0.0001), S-IgG (slope -2.44, 95% CI -3.35 to -1.54, p&0.0001) and RBD-IgG (slope -1.43, 95% CI -1.98 to -0.88, p&0.0001) were negatively correlated with viral load. S-IgG titers were lower in non-survivors than survivors (p=0.020) at week 4 after symptoms onset. IgM, IgG against N, S and RBD and NAbs developed in most severe COVID-19 patients, and do not correlate clearly with clinical outcomes. The levels of IgG antibodies against N, S and RBD were related to viral clearance.

34. **Association of cardiovascular disease and 10 other pre-existing comorbidities with COVID-19 mortality: A systematic review and meta-analysis.** Ssentongo P, Ssentongo AE, Heilbrunn ES, Ba DM, Chinchilli VM. *PLoS One.* 2020 Aug 26;15(8):e0238215. doi: 10.1371/journal.pone.0238215. eCollection 2020. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0238215
Findings: Eleven pre-existing comorbidities from 25 studies were included in the meta-analysis (n = 65, 484 patients with COVID-19; mean age; 61 years; 57% male). Patients with COVID-19 with cardiovascular disease, hypertension, diabetes, congestive heart failure, chronic kidney disease and cancer have a greater risk of mortality compared to patients with COVID-19 without these comorbidities. Tailored infection prevention and treatment strategies targeting this high-risk population might improve survival.

35. **Association of Troponin Levels with Mortality in Italian Patients Hospitalized with Coronavirus Disease 2019: Results of a Multicenter Study.** Lombardi CM, Carubelli V, Iorio A, et al. *JAMA Cardiol.* 2020 Aug 26. doi: 10.1001/jamacardio.2020.3538. https://jamanetwork.com/journals/jamacardiology/fullarticle/2769745

Findings: A total of 614 patients with COVID-19 were included in this study (mean age 67; 70.8% male), of whom 148 patients (24.1%) died during the hospitalization. Elevated troponin levels were found in 278 patients (45.3%). These patients were older (mean [SD] age, 64.0 [13.6] years vs 71.3 [12.0] years; P < .001) and had higher prevalence of hypertension (168 patients [50.5%] vs 182 patients [65.9%]; P < .001), heart failure (24 [7.2%]; 63 [22.8%]; P < .001), coronary artery disease (50 [15.0%] vs 87 [31.5%]; P < .001), and atrial fibrillation (33 [9.9%] vs 67 [24.3%]; P < .001). In this multicenter, cross-sectional study of Italian patients with COVID-19, elevated troponin was an independent variable associated with in-hospital mortality and a greater risk of cardiovascular and noncardiovascular complications during a hospitalization for COVID-19.

36. **Outcomes of Critically Ill Solid Organ Transplant Patients with COVID-19 in the United States.** Molnar MZ, Bhalla A, Azhar A, et al. *Am J Transplant*. 2020 Aug 26. doi: 10.1111/ajt.16280. https://onlinelibrary.wiley.com/doi/10.1111/ajt.16280
Findings: We analyzed data from a multicenter cohort study of adults with laboratory-confirmed COVID-19 admitted to ICUs at 68 hospitals across the United States from March 4th to May 8th, 2020. From 4,153 patients, we created a propensity score matched cohort of 386 patients, including 98 SOT patients and 288 non-SOT patients. Among the 386 patients, the median age was 60 years, 72% were male, and 41% were black. Death within 28 days of ICU admission was similar in SOT and non-SOT patients. Other outcomes and requirement for organ support including receipt of mechanical ventilation, development of acute respiratory distress syndrome, and receipt of vasopressors were also similar between groups. There was a trend toward higher risk of acute kidney injury requiring renal replacement therapy in SOT vs. non-SOT patients. Death and organ support requirement were similar between SOT and non-SOT critically ill patients with COVID-19.

37. **Return Hospital Admissions Among 1419 Covid-19 Patients Discharged from Five US Emergency Departments.** Kilaru AS, Lee K, Snider CK, et al. *Acad Emerg Med*. 2020 Aug 27. doi: 10.1111/acem.14117. https://onlinelibrary.wiley.com/doi/10.1111/acem.14117
Findings: To our knowledge, no prior study has evaluated the outcome of return hospital admission in patients with Covid-19 following ED discharge. This overall rate of return hospital admission is twice that reported for the general ED population prior to the pandemic, and elderly patients returned at a markedly higher rate. Furthermore, some risk factors, including age > 60 years, fever on presentation, and hypoxia on presentation, were associated with more than twice the probability of subsequent return hospital admission.

38. **Type 1 Diabetes in People Hospitalized for COVID-19: New Insights from the CORONADO Study.** Wargny M, Gourdy P, Ludwig L, et al. *Diabetes Care*. 2020 Aug 26:dc201217. doi: 10.2337/dc20-1217. https://care.diabetesjournals.org/content/early/2020/08/24/dc20-1217.full-text.pdf
Findings: A high prevalence of diabetes among patients with COVID-19 who required hospitalization has been consistently reported, reaching 33.8% in 5,700 people hospitalized for COVID-19 in the New York City area. In addition, diabetes was associated with more than a doubled risk of intensive care unit admission and more than a tripled risk of death. We report

among patients with diabetes requiring hospitalization for COVID-19, the present data suggest a lower risk of severe prognosis in those with T1D, especially in the younger ones.

39. **Patient Characteristics and Outcomes of 11,721 Patients with COVID19 Hospitalized Across the United States.** Fried MW, Crawford JM, Mospan AR, et al. *Clin Infect Dis*. 2020 Aug 28:ciaa1268. doi: 10.1093/cid/ciaa1268. https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa1268/5898276
Findings: A total of 11,721 patients were included (majority were >60 years of age [59.9%] and male [53.4%]). Comorbidities included hypertension (46.7%), diabetes (27.8%), cardiovascular disease (18.6%), obesity (16.1%), and chronic kidney disease (12.2%). Mechanical ventilation was required by 1,967 patients (16.8%). Mortality among hospitalized patients was 21.4% and increased to 70.5% among those on mechanical ventilation. Male sex, older age, obesity, geographic region, and the presence of chronic kidney disease or preexisting cardiovascular disease were associated with an increased odds of mechanical ventilation. All risk factors, with the exception of obesity, were associated with an increased odds of death. Many patients received investigational medications for treatment of COVID-19, including 48 patients on remdesivir and 4,232 on hydroxychloroquine.

40. **Assessment of the Modified CHA2DS2VASc Risk Score in Predicting Mortality in Patients Hospitalized with COVID-19.** Cetinkal G, Kocas BB, Ser OS, et al. *Am J Cardiol.* 2020 Aug 27:S0002-9149(20)30897-3. doi: 10.1016/j.amjcard.2020.08.040. https://www.ajconline.org/article/S0002-9149(20)30897-3/fulltext
Findings: Our study demonstrated that M-CHA2DS2VASC score might be useful for predicting in-hospital mortality in patients with COVID-19. Using this easily calculable score may also allow early identification of high risk COVID-19 patients and optimization of their treatment strategies; thereby reducing the risk of subsequent adverse events during hospitalization.

Survivorship & Rehabilitation

41. **Anxiety and depression symptoms after virological clearance of COVID-19: a cross-sectional study in Milan, Italy.** Tomasoni D, Bai F, Castoldi R, et al. *J Med Virol*. 2020 Aug 25. doi: 10.1002/jmv.26459. https://onlinelibrary.wiley.com/doi/abs/10.1002/jmv.26459
Findings: Prevalence of anxiety/depression was investigated in 105 COVID-19 patients at 1-3 months from virological clearance by Hospital Anxiety and Depression Scale (HADS-A/D). 30% of patients displayed pathological HADS-A/D, 52.4% showed persistent symptoms. Pathological HADS-A/D patients more commonly reported symptom persistence, even after adjustment for age, gender, disease severity. Psychological assessments should be encouraged in COVID-19 patients' follow-up.

42. **Post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19.** Garrigues E, Janvier P, Kherabi Y, et al. *J Infect.* 2020 Aug 24:S0163-4453(20)30562-4. doi: 10.1016/j.jinf.2020.08.029. https://www.journalofinfection.com/article/S0163-4453(20)30562-4/fulltext

Findings: The present study shows that most patients requiring hospitalization for COVID-19 still have persistent symptoms, even 110 days after being discharged, especially fatigue and dyspnoea. These results highlight the need for a long-term follow-up of those patients and rehabilitation programs. Surprisingly, many patients (mainly women) spontaneously reported significant hair loss, which may correspond to a telogen effluvium, secondary to viral infection and/or a stress generated by the hospitalization and the disease. Nevertheless, HRQoL was quite satisfactory, as most patients who had a professional activity before the infection went back to work.

Therapeutics

43. **Anticoagulation, Mortality, Bleeding and Pathology Among Patients Hospitalized with COVID-19: A Single Health System Study.** Girish N. Nadkarni, Anuradha Lala, et al. *J Am Coll Cardiol.* 2020 Aug 26. Epublished DOI:10.1016/j.jacc.2020.08.041
https://www.clinicalkey.com/#!/content/journal/1-s2.0-S0735109720364081
Findings: Among 4,389 patients, median age was 65 years with 44% female. Compared to no AC (n=1530, 34.9%), therapeutic (n=900, 20.5%) and prophylactic AC (n=1959, 44.6%) were associated with lower in-hospital mortality, and intubation. AC was associated with lower mortality and intubation among hospitalized COVID-19 patients. Compared to prophylactic AC, therapeutic AC was associated with lower mortality, though not statistically significant. Autopsies revealed frequent thromboembolic disease. These data may inform trials to determine optimal AC regimens.

44. **Retrospective analysis of high flow nasal therapy in COVID-19-related moderate-to-severe hypoxaemic respiratory failure.** Patel M, Gangemi A, Marron R, et al. *BMJ Open Respir Res*. 2020 Aug;7(1):e000650. doi: 10.1136/bmjresp-2020-000650.
https://bmjopenrespres.bmj.com/content/bmjresp/7/1/e000650.full.pdf
Findings: This was a retrospective analysis of consecutive patients admitted to Temple University Hospital in Philadelphia, Pennsylvania, from 10 March 2020 to 24 April 2020 with moderate-to-severe respiratory failure treated with HFNT. Primary outcome was prevention of intubation. Of the 445 patients with COVID-19, 104 met our inclusion criteria. The average age was 60.66 (+13.50) years, 49 (47.12 %) were female, 53 (50.96%) were African-American, 23 (22.12%) Hispanic. Overall, mortality was 14.44% (n=15) in our cohort with 13 (34.4%) in the progressed to intubation group and 2 (2.9%) in the non-intubation group. HFNT use is associated with a reduction in the rate of invasive mechanical ventilation and overall mortality in patients with COVID-19 infection.

45. **Impact of Famotidine Use on Clinical Outcomes of Hospitalized Patients With COVID-19.** Mather JF, Seip RL, McKay RG. *Am J Gastroenterol*. 2020 Aug 26. doi: 10.14309/ajg.0000000000000832.
https://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=ovft&AN=00000434-900000000-99159&PDF=y

Findings: Famotidine use in hospitalized patients with COVID-19 is associated with a lower risk of mortality, lower risk of combined outcome of mortality and intubation, and lower levels of serum markers for severe disease in hospitalized patients with COVID-19.

46. **Effect of hydroxychloroquine with or without azithromycin on the mortality of COVID-19 patients: a systematic review and meta-analysis.** Fiolet T, Guihur A, Rebeaud M, et al. *Clin Microbiol Infect*. 2020 Aug 21:S1198-743X(20)30505-X. doi:10.1016/j.cmi.2020.08.022. https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(20)30505-X/fulltext
Findings: 29 articles met our inclusion criteria. All studies except one were conducted on hospitalized patients and evaluated the effects of hydroxychloroquine with or without azithromycin. Among the 29 articles, 3 were randomized controlled trials (RCT), one was a non-randomized trial and 25 were observational studies, including 10 with a critical risk of bias and 15 with a serious or moderate risk of bias. After excluding studies with critical risk of bias, the meta-analysis included 11,932 participants for the hydroxychloroquine group, 8,081 for the hydroxychloroquine with azithromycin group and 12,930 for the control group. Hydroxychloroquine was not significantly associated with mortality: pooled Relative Risk RR=0.83 (95% CI: 0.65-1.06, n=17 studies) for all studies and RR=1.09 (95% CI: 0.97-1.24, n=3 studies) for RCTs. Hydroxychloroquine with azithromycin was associated with an increased mortality: RR=1.27 (95% CI: 1.04-1.54, n=7 studies). We found similar results with a Bayesian meta-analysis. CONCLUSION: Hydroxychloroquine alone was not associated with reduced mortality in hospitalized COVID-19 patients but the combination of hydroxychloroquine and azithromycin significantly increased mortality.

Transmission / Infection Control

47. **Genomic Evidence for a Case of Reinfection with SARS-CoV-2.** Tillett R, Sevinsky J, et al. *SSRN PREPRINT*. 27 Aug 2020. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3681489
Findings: Herein, we describe the data from an investigation of two instances of SARS-CoV-2 infection in the same individual in **Nevada**. Through nucleic acid sequence analysis, the viruses associated with each instance of infection were found to possess a degree of genetic discordance that cannot be explained reasonably through short-term in vivo evolution. We conclude that it is possible for humans to become infected multiple times by SARS-CoV-2, but the generalizability of this finding is not known.

48. **Healthcare Worker Infection with SARS-CoV-2 and Test-Based Return to Work.** Shenoy ES, West LR, Hooper DC, et al. *Infect Control Hosp Epidemiol*. 2020 Aug 26:1-11. doi: 10.1017/ice.2020.438. https://tinyurl.com/y5552a6f
Findings: Infection of HCW with SARS-CoV-2 can result from either community or workplace exposures. Determination of when the HCW can return to work (RTW) has important implications for patient and workforce safety as well as workforce preservation. On April 13, 2020, the CDC modified its guidance to indicate a preference for use of a test-based strategy to determine when HCW may RTW in healthcare settings over a symptom-based strategy. Subsequent iterations have indicated that either time+symptom-based or test-based approaches are acceptable.1 At Mass General Brigham (MGB), test-based RTW criteria was

established at the start of the COVID-19 pandemic. We report average intervals until test-based clearance and the number of excess lost work days using test-based clearance.

49. **Cluster of SARS-CoV-2 infections linked to music clubs in Osaka, Japan: asymptomatically infected persons can transmit the virus as soon as 2 days after infection.** Sugano N, Ando W, Fukushima W. *J Infect Dis.* 2020 Aug 25:jiaa542. doi: 10.1093/infdis/jiaa542. https://academic.oup.com/jid/advance-article/doi/10.1093/infdis/jiaa542/5896928
Findings: Seemingly healthy people could spread SARS-CoV-2 during intense activities in enclosed environments without sufficient ventilation. Asymptomatically infected persons can transmit the virus as soon as 2 days after infection. Continuous efforts to avoid crowding and to maintain personal hygiene are needed for effective control of COVID-19.

50. **Availability of Personal Protective Equipment and Infection Prevention Supplies During the First Month of the COVID-19 Pandemic: A National Study by the APIC COVID-19 Task Force.** Rebmann T, Vassallo A, Holdsworth JE. *Am J Infect Control.* 2020 Aug 26:S0196-6553(20)30814-2. doi: 10.1016/j.ajic.2020.08.029. https://www.sciencedirect.com/science/article/pii/S0196655320308142
Findings: 1,201 infection preventionists participated in a survey. Participants reported running a bit low to almost being out of all PPE types. More had sufficient gloves (63.4%) compared to all other PPE types (p < .001 for all). Face shields and N95 respirators were the least available (13.6% and 18.2% had sufficient supplies, respectively; p < .001 for all). Many (66.9%) had sufficient hand soap, but far fewer had sufficient hand sanitizer (29.5%, $X2=211.1$, p < .001). Less than half (45.4%, n=545) had sufficient disinfection supplies. Many US healthcare facilities had very low amounts of PPE, hand hygiene products, and disinfection supplies early on during the pandemic. A lack of these supplies can lead to occupational exposures and illness as well as healthcare-associated transmission of COVID-19 and other diseases.

51. **COVID-19 patients in earlier stages exhaled millions of SARS-CoV-2 per hour.** Ma J, Qi X, Chen H, et al. *Clinical Infectious Diseases* 28 August 2020, https://doi.org/10.1093/cid/ciaa1283 https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa1283/5898624
Findings: Exhaled breath samples had the highest positive rate (26.9%, n=52), followed by surface swabs (5.4%, n=242), and air samples (3.8%, n=26). COVID-19 patients recruited in Beijing exhaled millions of SARS-CoV-2 RNA copies into the air per hour. Exhaled breath emission may play an important role in the COVID-19 transmission.

52. **Outbreak of COVID-19 in a nursing home associated with aerosol transmission as a result of inadequate ventilation.** de Man P, Paltansing S, Ong DSY, et al. *Clinical Infectious Diseases.* 28 August 2020 https://doi.org/10.1093/cid/ciaa1270 https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa1270/5898577
Findings: Our data suggest that an outbreak was caused by aerosol transmission of COVID-19 in a situation of inadequate ventilation for several reasons. First, the near simultaneous detection of COVID-19 infections of almost all residents HCWs within a ward in which care was provided with surgical masks. Second, the limitation of the outbreak to this particular ward with a

deviating ventilation system that recirculated unfiltered inside air in combination with the detection of COVID-19 on the filters of this system. Finally, the outbreak in this nursing home emerged in a period of low background prevalence of COVID19 infections in the community. We advise that prevention of COVID-19 transmission should take into account the possibility of aerosol transmission in healthcare facilities and other buildings where ventilation systems recirculate unfiltered inside air.

53. **Community Outbreak Investigation of SARS-CoV-2 Transmission Among Bus Riders in Eastern China.** Shen Y, Li C, Dong H, et al. *JAMA Intern Med*. September 1, 2020. doi:10.1001/jamainternmed.2020.5225
https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2770172
Findings: In this cohort study and case investigation of a community outbreak of COVID-19 in Zhejiang province, individuals who rode a bus to a worship event with a patient with COVID-19 had a higher risk of SARS-CoV-2 infection than individuals who rode another bus to the same event. Airborne spread of SARS-CoV-2 seems likely to have contributed to the high attack rate in the exposed bus. Future efforts at prevention and control must consider the potential for airborne spread of the virus.

Vaccine

54. **Acceptability of a COVID-19 vaccine among adults in the United States: How many people would get vaccinated?** Reiter PL, Pennell ML, Katz ML. *Vaccine.* 2020 Aug 20:S0264-410X(20)31084-7. doi: 10.1016/j.vaccine.2020.08.043.
https://www.sciencedirect.com/science/article/pii/S0264410X20310847
Findings: We conducted an online survey of adults ages 18 and older in the United States (n = 2,006) in May 2020. Multivariable relative risk regression identified correlates of participants' willingness to get a COVID-19 vaccine. Overall, 69% of participants were willing to get a COVID-19 vaccine. Participants were more likely to be willing to get vaccinated if they thought their healthcare provider would recommend vaccination or if they were moderate or liberal in their political leaning. Participants were also more likely to be willing to get vaccinated if they reported higher levels of perceived likelihood getting a COVID-19 infection in the future, perceived severity of COVID-19 infection, or perceived effectiveness of a COVID-19 vaccine. Participants were less likely to be willing to get vaccinated if they were non-Latinx black or reported a higher level of perceived potential vaccine harms.

55. **Viewpoint of a WHO Advisory Group Tasked to Consider Establishing a Closely-Monitored Challenge Model of COVID-19 in Healthy Volunteers.** Levine MM, Abdullah S, Arabi YM, et al. *Clin Infect Dis.* 2020 Aug 28:ciaa1290. doi: 10.1093/cid/ciaa1290.
https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa1290/5898660
Findings: WHO convened an Advisory Group (AG) to consider the feasibility, potential value and limitations of establishing a closely-monitored challenge model of experimental SARS-CoV-2 infection and COVID-19 in healthy adult volunteers. The AG included experts in design, establishment and performance of challenges. This report summarizes issues that render a COVID-19 model daunting to establish (SARS-CoV-2's potential to cause severe/fatal illness, its

high transmissibility, and lack of a "rescue treatment" to prevent progression from mild/moderate to severe clinical illness) and it proffers prudent strategies for stepwise model development, challenge virus selection, guidelines for manufacturing challenge doses, and ways to contain SARS-CoV-2 and prevent transmission to household/community contacts. A COVID-19 model could demonstrate protection against virus shedding and/or illness induced by prior SARS-CoV-2 challenge or vaccination. A limitation of the model is that vaccine efficacy in experimentally challenged healthy young adults cannot per se be extrapolated to predict efficacy in elderly/high-risk adults.

Women & Children

56. **Ocular Manifestations and Clinical Characteristics of Children with Laboratory-Confirmed COVID-19 in Wuhan, China.** Ma N, Li P, Wang X, et al. *JAMA Ophthalmol*. August 26, 2020. doi:10.1001/jamaophthalmol.2020.3690
https://jamanetwork.com/journals/jamaophthalmology/fullarticle/2769877
Findings: In this cross-sectional study, children hospitalized with COVID-19 in Wuhan, China, presented with a series of onset symptoms including fever, cough, and ocular manifestations, such as conjunctival discharge, eye rubbing, and conjunctival congestion. Patients' systemic clinical symptoms or cough were associated with ocular symptoms. Ocular symptoms recovered or improved eventually.

57. **SARS-CoV-2 in cardiac tissue of a child with COVID-19-related multisystem inflammatory syndrome.** Dolhnikoff M, Ferreira Ferranti J,Aparecida de Almeida Monteiro R, et al. *Lancet Child Adolescent Health*. August 20, 2020 DOI:https://doi.org/10.1016/S2352-4642(20)30257-1
https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(20)30257-1/fulltext
Findings: Our case report shows inflammatory changes in the cardiac tissue of a child with MIS-C related to COVID-19, which led to cardiac failure and death. SARS-CoV-2 could be detected in cardiac tissue by RT-PCR and electron microscopy. Despite the evident systemic inflammation and final progression to multiorgan failure, clinical, echocardiographic, and laboratory findings strongly indicated that heart failure was the main determinant of the fatal outcome. Further, the autopsy showed myocarditis, pericarditis, and endocarditis, with intense and diffuse tissue inflammation, and necrosis of cardiomyocytes. Moreover, the finding of SARS-CoV-2 in heart tissue indicates that myocardial inflammation was probably a primary response to the virus-induced injury to cardiac cells.

58. **Clinical Characteristics and Viral RNA Detection in Children with Coronavirus Disease 2019 in the Republic of Korea.** Han MS, Choi EH, Chang SH, et al. *JAMA Pediatr*. August 28, 2020. doi:10.1001/jamapediatrics.2020.3988
https://jamanetwork.com/journals/jamapediatrics/fullarticle/2770150
Findings: In this case series study, inapparent infections in children may have been associated with silent COVID-19 transmission in the community. Heightened surveillance using laboratory screening will allow detection in children with unrecognized SARS-CoV-2 infection.

GUIDELINES & CONSENSUS STATEMENTS

[Diagnosis and Treatment of Pulmonary Embolism During the COVID-19 Pandemic: A Position Paper from the National PERT Consortium.](#) *Chest.* 2020 Aug 27:S0012-3692(20)34287-2. doi: 10.1016/j.chest.2020.08.2064.

[COVID-19 Coagulopathy in Pregnancy: Critical Review, Preliminary Recommendations and ISTH Registry - Communication from the ISTH SSC for Women's Health.](#) *J Thromb Haemost.* 2020 Aug 26. doi: 10.1111/jth.15072.

FDA / CDC / NIH / WHO Updates

CDC - [Overview of Testing for SARS-CoV-2 (COVID-19).](#) Updated Aug. 24, 2020 - revised to exclude people who were exposed to the novel coronavirus but are not exhibiting symptoms of Covid-19.
See also: [AMA statement on CDC changes to COVID-19 testing guidance](#); [IDSA/HIVMA Statement on Changes to CDC Guidance](#)

FDA - [COVID-19 Update: FDA Broadens Emergency Use Authorization for Veklury (remdesivir) to Include All Hospitalized Patients for Treatment of COVID-19](#), updated August 28, 2020.

FDA - [COVID-19 Update: FDA Authorizes First Diagnostic Test Where Results Can Be Read Directly From Testing Card.](#) August 26, 2020.

NIH - [Phase 3 Clinical Testing in the US of AstraZeneca COVID-19 Vaccine Candidate Begins](#). August 31, 2020.

Commentary & News

Moderna trial results - [mRNA-1273 Vaccine Against COVID-19 Phase 1 Interim Analysis of Older Adult Cohorts (ages 56-70 and 71+)](#)

[Nevada State Public Health Lab-led team studying COVID-19 reinfection](#) see **published article above** under *Transmission / Infection Control*

[The Impact of COVID-19 on Individuals With Intellectual and Developmental Disabilities: Clinical and Scientific Priorities.](#) *Am J Psychol,* August 27 2020.

[COVID-19 vaccine trials should seek worthwhile efficacy.](#) *Lancet*, August 27 2020.

[Developing Safe and Effective Covid Vaccines — Operation Warp Speed's Strategy and Approach.](#) *NEJM*, August 26 2020.

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