

## COVID-19 Resource Desk

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Prepared by [System Library Services](#)

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### New Research

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

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

### Basic Science / Virology / Pre-clinical

- 1. Phase 1/2 Study to Describe the Safety and Immunogenicity of a COVID-19 RNA Vaccine Candidate (BNT162b1) in Adults 18 to 55 Years of Age: Interim Report.** Mulligan MJ, Lyke KE, Kitchin N, et al. *medRxiv* PREPRINT. July 1, 2020. <https://doi.org/10.1101/2020.06.30.20142570>  
<https://www.medrxiv.org/content/10.1101/2020.06.30.20142570v1.full.pdf>  
Findings: The clinical findings for the BNT162b1 RNA-based vaccine candidate are encouraging and strongly support accelerated clinical development and at-risk manufacturing to maximize the opportunity for the rapid production of a SARS-CoV-2 vaccine to prevent COVID-19 disease.
- 2. Identification of a druggable binding pocket in the spike protein reveals a key site for existing drugs potentially capable of combating Covid-19 infectivity.** Drew ED, Janes RW. *BMC Mol Cell Biol.* 2020 Jul 1;21(1):49. doi: 10.1186/s12860-020-00294-x.  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7327214/>  
Findings: This study highlights possible drugs already in use as pharmaceuticals that may act as agents to interfere with the movements of the domains within this protein essential for the infectivity processes and hence might slow, or even halt, the infection of host cells by this new coronavirus. As these are existing pharmaceuticals already approved for use in humans, this knowledge could accelerate their roll-out, through repurposing, for affected individuals and help guide the efforts of other researchers in finding effective treatments for the disease.

### Clinical Syndrome

- 3. Characteristics of Adult Outpatients and Inpatients with COVID-19 - 11 Academic Medical Centers, United States, March-May 2020.** Tenforde MW, Billig Rose E, Lindsell CJ, et al. *MMWR Morb Mortal Wkly Rep.* 2020 Jul 3;69(26):841-846. doi: 10.15585/mmwr.mm6926e3.  
[https://www.cdc.gov/mmwr/volumes/69/wr/mm6926e3.htm?s\\_cid=mm6926e3\\_w](https://www.cdc.gov/mmwr/volumes/69/wr/mm6926e3.htm?s_cid=mm6926e3_w)  
Findings: Among 350 interviewed patients (271 [77%] outpatients and 79 [23%] inpatients), inpatients were older, more likely to be Hispanic and to report dyspnea than outpatients. Fewer inpatients (39%, 20 of 51) reported a return to baseline level of health at 14-21 days than did

outpatients (64%, 150 of 233) ( $p = 0.001$ ). Overall, approximately one half (46%) of patients reported known close contact with someone with COVID-19 during the preceding 2 weeks. This was most commonly a family member (45%) or a work colleague (34%). Approximately two thirds (64%, 212 of 333) of participants were employed; only 35 of 209 (17%) were able to telework. These findings highlight the need for screening, case investigation, contact tracing, and isolation of infected persons to control transmission of SARS-CoV-2 infection during periods of community transmission. The need for enhanced measures to ensure workplace safety, including ensuring social distancing and more widespread use of cloth face coverings, are warranted.

4. **Risk of Ischemic Stroke in Patients with Coronavirus Disease 2019 (COVID-19) vs Patients with Influenza.** Merkler AE, Parikh NS, Mir S, et al. *JAMA Neurol.* 2020 Jul 2. doi:

10.1001/jamaneurol.2020.2730.

<https://jamanetwork.com/journals/jamaneurology/fullarticle/2768098>

Findings: In this retrospective cohort study from 2 New York City academic hospitals, approximately 1.6% of adults with COVID-19 who visited the emergency department or were hospitalized experienced ischemic stroke, a higher rate of stroke compared with a cohort of patients with influenza. Additional studies are needed to confirm these findings and to investigate possible thrombotic mechanisms associated with COVID-19.

5. **Evolution of Altered Sense of Smell or Taste in Patients with Mildly Symptomatic COVID-19.**

Boscolo-Rizzo P, Borsetto D, et al. *JAMA Otolaryngol Head Neck Surg.* 2020 Jul 2. doi:

10.1001/jamaoto.2020.1379.

<https://jamanetwork.com/journals/jamaotology/article-abstract/2767781>

Findings: At 4 weeks from the onset, 89% of the SARS-CoV-2-positive mildly symptomatic patients who had had a sudden onset of altered sense of smell or taste experienced a complete resolution or improvement of these symptoms. Persistent loss of smell or taste was not associated with persistent SARS-CoV-2 infection.

6. **Clinical characteristics and factors associated with long-term viral excretion in patients with SARS-CoV-2 infection: a single center 28-day study.** Shi D, Wu W, Wang Q, et al. *J Infect Dis.*

2020 Jul 2:jiaa388. doi: 10.1093/infdis/jiaa388.

<https://academic.oup.com/jid/article/doi/10.1093/infdis/jiaa388/5866521>

Findings: Among 99 patients, 61 patients had SARS-CoV-2 clearance (virus-negative group), but 38 patients had sustained positive results (virus-positive group). The median duration of SARS-CoV-2 excretion was 15 days among the virus-negative patients. SARS-CoV-2 RNA clearance time was associated with sex, disease severity and lymphocyte function. The current antiviral protocol and low-to-moderate dosage of corticosteroid had little effect on the duration of viral excretion.

7. **High Incidence of Barotrauma in Patients with COVID-19 Infection on Invasive Mechanical Ventilation.** McGuinness G, Zhan C, Rosenberg N, et al. *Radiology.* 2020 Jul 1:202352. doi:

10.1148/radiol.2020202352. <https://pubs.rsna.org/doi/10.1148/radiol.2020202352>

Findings: 601 patients with COVID-19 infection underwent invasive mechanical ventilation. There were 89/601 (15%) patients with one or more barotrauma events, for a total of 145 barotrauma events (24% overall events). During the same period, 196 patients without COVID-19 infection with invasive mechanical ventilation had 1 barotrauma event (.5%). Of 285 patients with ARDS over the prior 4 years on invasive mechanical ventilation, 28 patients (10%) had 31 barotrauma events, with overall barotrauma rate of 11%. Barotrauma is an independent risk factor for death in COVID-19 and is associated with longer hospital length of stay. Patients with COVID-19 infection and invasive mechanical ventilation had a higher rate of barotrauma than patients with ARDS and patients without COVID-19 infection.

8. **Clinical Recurrences of COVID-19 Symptoms After Recovery: Viral Relapse, Reinfection or Inflammatory Rebound?** Batisse D, Benech N, Botelho-Nevers E, et al. *J Infect.* 2020 Jun 30;S0163-4453(20)30454-0. doi: 10.1016/j.jinf.2020.06.073.

<https://www.sciencedirect.com/science/article/pii/S0163445320304540>

Findings: We report a national case series of 11 virologically-confirmed COVID-19 patients having experienced a second clinically- and virologically-confirmed acute COVID-19 episode. According to the clinical history, we discuss either re-infection or reactivation hypothesis. Larger studies including further virological, immunological and epidemiologic data are needed to understand the mechanisms of these recurrences.

9. **Endotheliopathy in COVID-19-associated Coagulopathy: Evidence from a Single-Centre, Cross-Sectional Study.** Goshua G, Pine AB, Meizlish ML, et al. *Lancet Haematol.* 2020 Jun 30;S2352-3026(20)30216-7. doi: 10.1016/S2352-3026(20)30216-7.

[https://www.thelancet.com/journals/lanhae/article/PIIS2352-3026\(20\)30216-7/fulltext](https://www.thelancet.com/journals/lanhae/article/PIIS2352-3026(20)30216-7/fulltext)

Findings: An important feature of severe acute respiratory syndrome coronavirus 2 pathogenesis is COVID-19-associated coagulopathy, characterised by increased thrombotic and microvascular complications. Previous studies have suggested a role for endothelial cell injury in COVID-19-associated coagulopathy. Our findings show that endotheliopathy is present in COVID-19 and is likely to be associated with critical illness and death. Early identification of endotheliopathy and strategies to mitigate its progression might improve outcomes in COVID-19.

10. **Liver Involvement Is Not Associated with Mortality: Results from a Large Cohort of SARS-CoV-2 Positive Patients.** Ponziani FR, Del Zompo F, Nesci A, et al. *Aliment Pharmacol Ther.* 2020 Jul 6. doi: 10.1111/apt.15996. <https://onlinelibrary.wiley.com/doi/abs/10.1111/apt.15996>

Findings: In SARS-CoV-2 positive patients without pre-existing severe chronic liver disease, baseline liver tests abnormalities are associated with the risk of ICU admission and tend to normalize over time. ALP peak value seems to be predictive of a worse prognosis.

### Diagnosics & Screening

11. **Suboptimal biological sampling as a probable cause of false-negative COVID-19 diagnostic test results.** Kinloch NN, Ritchie G, Brumme CJ, et al. *J Infect Dis.* 2020 Jun 28;jiaa370. doi:

10.1093/infdis/jiaa370.

<https://academic.oup.com/jid/article/doi/10.1093/infdis/jiaa370/5864227>

Findings: False-negative SARS-CoV-2 test results can negatively impact the clinical and public health response to COVID-19. We used droplet digital PCR (ddPCR) to demonstrate that human DNA levels, a stable molecular marker of sampling quality, were significantly lower in samples from 40 confirmed or suspected COVID-19 cases that yielded negative diagnostic test results (i.e. suspected false-negative test results) compared to a representative pool of 87 specimens submitted for COVID-19 testing. Our results support suboptimal biological sampling as a contributor to false-negative COVID-19 test results and underscore the importance of proper training and technique in the collection of nasopharyngeal specimens.

**12. Utility of Stool PCR for the Diagnosis of COVID-19: Comparison of Two Commercial Platforms.**

Szymczak WA, Goldstein DY, Orner EP, et al. *J Clin Microbiol.* 2020 Jul 1:JCM.01369-20. doi: 10.1128/JCM.01369-20.

<https://jcm.asm.org/content/jcm/early/2020/06/26/JCM.01369-20.full.pdf>

Findings: SARS-CoV-2 can be detected in the stool of some patients for greater than four weeks suggesting that stool may hold utility as an additional source for diagnosis. We validated the Cepheid Xpert Xpress SARS-CoV-2 and Hologic Panther Fusion real-time RT-PCR assays for detection of viral RNA in stool specimens and compared performance. We utilized remnant stool specimens (n=79) from 77 patients with gastrointestinal symptoms. Forty-eight patients had PCR-confirmed COVID-19 and 29 were either nasopharyngeal/oropharyngeal PCR negative or presented for reasons unrelated to COVID-19 and were not tested. Positive percent agreement between the Cepheid and Hologic assays was 93% (95% CI: 81.1%-98.2%) and negative percent agreement was 96% (95% CI: 89%-0.99%). Our results demonstrate acceptable agreement between two commercially available molecular assays and support the use of stool PCR to confirm diagnosis when SARS-CoV-2 is undetectable in the upper respiratory tract.

**13. Clinical Validity of Serum Antibodies to SARS-CoV-2: A Case-Control Study.** Caturegli G, Materi

J, Howard BM, et al. *Ann Intern Med.* 2020 Jul 6. doi: 10.7326/M20-2889.

<https://www.acpjournals.org/doi/10.7326/M20-2889>

Findings: : Antibodies to SARS-CoV-2 demonstrate infection when measured at least 14 days after symptom onset, associate with clinical severity, and provide valuable diagnostic support in patients who test negative by NAAT but remain clinically suspicious for COVID-19.

## Epidemiology & Public Health

**14. Black Lives Matter Protests, Social Distancing, and COVID-19.** Dave DM, Friedson AI,

Matsuzawa K et al. *NATIONAL BUREAU OF ECONOMIC RESEARCH Working Paper 27408*

PREPRINT <http://www.nber.org/papers/w27408>

Findings: Using anonymous cell phone tracking data from SafeGraph, Inc., as well as data on the local prevalence of COVID-19 from the Centers for Disease Control and Prevention, we demonstrate that cities which had protests saw an increase in social distancing behavior for the overall population relative to cities that did not. In addition, we find no evidence that net

COVID-19 case growth differentially rose following the onset of Black Lives Matter protests, and even modest evidence of a small longer-run case growth decline.

15. **Estimation of Excess Deaths Associated With the COVID-19 Pandemic in the United States, March to May 2020.** Weinberger DM, Chen J, Cohen T, et al. *JAMA Intern Med.* 2020 Jul 1. doi: 10.1001/jamainternmed.2020.3391.  
<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2767980>  
Findings: There were approximately 781,000 total deaths in the United States from March 1 to May 30, 2020, representing 122,300 more deaths than would typically be expected at that time of year. There were 95,235 reported deaths officially attributed to COVID-19 from March 1 to May 30, 2020. The number of excess all-cause deaths was 28% higher than the official tally of COVID-19-reported deaths during that period. In several states, these deaths occurred before increases in the availability of COVID-19 diagnostic tests and were not counted in official COVID-19 death records. There was substantial variability between states in the difference between official COVID-19 deaths and the estimated burden of excess deaths. Excess deaths provide an estimate of the full COVID-19 burden and indicate that official tallies likely undercount deaths due to the virus.
16. **Will Coronavirus Disease 2019 Become Seasonal?** Kanzawa M, Spindler H, Anglemyer A, et al. *J Infect Dis.* 2020 Jun 21:jiaa345. doi: 10.1093/infdis/jiaa345.  
<https://academic.oup.com/jid/article/doi/10.1093/infdis/jiaa345/5860444>  
Findings: This manuscript explores the question of the seasonality of severe acute respiratory syndrome coronavirus 2 by reviewing 4 lines of evidence related to viral viability, transmission, ecological patterns, and observed epidemiology of coronavirus disease 2019 in the Southern Hemispheres' summer and early fall.
17. **High Proportion of Asymptomatic SARS-CoV-2 Infections in 9 Long-Term Care Facilities, Pasadena, California, USA, April 2020.** Feaster M, Goh YY. *Emerg Infect Dis.* 2020 Jul 2;26(10). doi: 10.3201/eid2610.202694. [https://wwwnc.cdc.gov/eid/article/26/10/20-2694\\_article](https://wwwnc.cdc.gov/eid/article/26/10/20-2694_article)  
Findings: Our analysis of coronavirus disease prevalence in 9 long-term care facilities demonstrated a high proportion (40.7%) of asymptomatic infections among residents and staff members. Infection control measures in congregate settings should include mass testing-based strategies in concert with symptom screening for greater effectiveness in preventing the spread of severe acute respiratory syndrome coronavirus.
18. **Similarities and differences in COVID-19 awareness, concern, and symptoms by race and ethnicity in the United States: A cross-sectional survey.** Jones J, Sullivan PS, Sanchez T, et al. *J Med Internet Res.* 2020 Jul 1. doi: 10.2196/20001.  
<https://preprints.jmir.org/preprint/20001/accepted>  
Findings: A total of 1,435 (3.6% Asian, 11.0% non-Hispanic Black, 38.2% Hispanic, 40.9% non-Hispanic white, and 6.3% other or multiple races) participants completed the survey. Non-Hispanic white and Asian participants were more likely to estimate that the number of current cases was at least 100,000 and were more likely to answer all 14 COVID-19 knowledge scale questions correctly compared to Hispanic (19.7%) and non-Hispanic Black (15.8%) participants.

We observed differences with respect to knowledge of appropriate methods to prevent infection by the novel coronavirus that causes COVID-19. Deficits in knowledge of proper control methods might further exacerbate existing race/ethnicity disparities.

19. **Modeling, state estimation, and optimal control for the US COVID-19 outbreak.** Tsay C, Lejarza F, Stadtherr MA, Baldea M. *Sci Rep.* 2020 Jul 1;10(1):10711. doi: 10.1038/s41598-020-67459-8. <https://www.nature.com/articles/s41598-020-67459-8>

Findings: In this work, we introduce a novel optimization-based decision-making framework for managing the COVID-19 outbreak in the US. This includes modeling the dynamics of affected populations, estimating the model parameters and hidden states from data, and an optimal control strategy for sequencing social distancing and testing events such that the number of infections is minimized. The analysis of our extensive computational efforts reveals that social distancing and quarantining are most effective when implemented early, with quarantining of confirmed infected subjects having a much higher impact. Further, we find that "on-off" policies alternating between strict social distancing and relaxing such restrictions can be effective at "flattening" the curve while likely minimizing social and economic cost.

20. **Estimating the infection fatality risk of COVID-19 in New York City, March 1-May 16, 2020.**

Yang W, Kandula S, Huynh M, et al. *medRxiv* PREPRINT. June 29, 2020. doi:

<https://doi.org/10.1101/2020.06.27.20141689>

Findings: During March 1-May 16, 2020, 191,392 laboratory-confirmed COVID-19 cases were diagnosed and reported and 20,141 confirmed and probable COVID-19 deaths occurred among New York City residents. We applied a network model-inference system developed to support the City's pandemic response to estimate underlying SARS-CoV-2 infection rates. Based on these estimates, we further estimated the infection fatality risk for 5 age groups (i.e. <25, 25-44, 45-64, 65-74, and 75+ years) and all ages overall, during March 1-May 16, 2020. We estimated an overall IFR of 1.45% in NYC. In particular, weekly IFR was estimated as high as 6.1% for 65-74 year-olds and 17.0% for 75+ year-olds. These results are based on more complete ascertainment of COVID-19-related deaths in NYC and thus likely more accurately reflect the true, higher burden of death due to COVID-19 than previously reported elsewhere.

## Prognosis

21. **Predictors of Progression from Moderate to Severe COVID-19: A Retrospective Cohort.** Cheng B, Hu J, Zuo X, et al. *Clin Microbiol Infect.* 2020 Jul 2;S1198-743X(20)30379-7. doi: 10.1016/j.cmi.2020.06.033. [https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X\(20\)30379-7/fulltext](https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(20)30379-7/fulltext)

Findings: All 456 adult patients with COVID-19 of moderate severity diagnosed using qRT-PCR and hospitalized at the Central Hospital of Wuhan, China, from Jan 1 to Mar 20, 2020 were enrolled in this retrospective study. Higher levels of NLR and CRP at admission were associated with poor prognosis of moderate COVID-19 patients. NLR and CRP were good predictors of progression to critical condition and death.

22. **Outcomes from intensive care in patients with COVID-19: a systematic review and meta-analysis of observational studies.** Armstrong RA, Kane AD, Cook TM. *Anaesthesia*. 2020 Jun 30. doi: 10.1111/anae.15201. <https://onlinelibrary.wiley.com/doi/10.1111/anae.15201>  
Results: Twenty-four observational studies including 10,150 patients were identified from centres across Asia, Europe, and North America. In patients with completed ICU admissions with COVID-19 infection, combined ICU mortality was 41.6%. Subgroup analysis by continent showed that mortality is broadly consistent across the globe. As the pandemic has progressed the reported mortality rates have reduced from above 50% to close to 40%. The in-ICU mortality from COVID-19 is higher than usually seen in ICU admissions with other viral pneumonias. Importantly, the mortality from completed episodes of ICU differs considerably from the crude mortality rates in some early reports.
23. **Is BMI higher in younger patients with COVID-19? Association between BMI and COVID-19 hospitalization by age.** Bhasin A, Nam H, Yeh C, et al. *Obesity*. 2020 Jul 1. doi: 10.1002/oby.22947. <https://onlinelibrary.wiley.com/doi/abs/10.1002/oby.22947>  
Findings: We found younger patients (age <50 years) with COVID-19 had higher mean BMI than older patients with COVID-19, with and without diabetes and hypertension. This trend did not exist in patients without COVID-19 hospitalized during the same time-period.
24. **Insights into pathogenesis of fatal COVID-19 pneumonia from histopathology with immunohistochemical and viral RNA studies.** Sauter JL, Baine MK, Butnor KJ, et al. *Histopathology*. 2020 Jul 2. doi: 10.1111/his.14201. <https://onlinelibrary.wiley.com/doi/abs/10.1111/his.14201?af=R>  
Findings: Presence of SARS-CoV-2 viral RNA by NGS early in the disease course and expression of viral antigen by IHC exclusively in the acute but not in the organizing phase of diffuse alveolar damage, suggests that the virus may play a major role in initiating the acute lung injury of DAD, but when DAD progresses to the organizing phase, the virus may have been cleared from the lung by the patient's immune response. These findings suggest the possibility of a major change during the disease course of COVID-19 pneumonia that may have therapeutic implications. Frequent thrombi and microthrombi may also present potential targets for therapeutic intervention.
25. **The Effect of Frailty on Survival in Patients With COVID-19 (COPE): A Multicentre, European, Observational Cohort Study.** Hewitt J, Carter B, Vilches-Moraga A, et al. *Lancet Public Health*. 2020 Jun 30;S2468-2667(20)30146-8. doi: 10.1016/S2468-2667(20)30146-8. [https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667\(20\)30146-8/fulltext](https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(20)30146-8/fulltext)  
Findings: In a large population of patients admitted to hospital with COVID-19, disease outcomes were better predicted by frailty than either age or comorbidity.

## Therapeutics

26. **Treatment with Hydroxychloroquine, Azithromycin, and Combination in Patients Hospitalized with COVID-19.** Arshad S, Kilgore P, Chaudhry ZS, Henry Ford COVID-19 Task Force et al. *Int J*

*Infect Dis* 2020 Jul 1. doi: <https://doi.org/10.1016/j.ijid.2020.06.099>  
[https://www.ijidonline.com/article/S1201-9712\(20\)30534-8/fulltext](https://www.ijidonline.com/article/S1201-9712(20)30534-8/fulltext)

Findings: Of 2,541 patients, with a median total hospitalization time of 6 days, median age was 64 years, 51% male, 56% African American, with median time to follow-up of 28.5 days. Overall in-hospital mortality was 18.1%; by treatment: hydroxychloroquine + azithromycin, 157/783 (20.1% [95% CI: 17.3%-23.0%]), hydroxychloroquine alone, 162/1202 (13.5% [95% CI: 11.6%-15.5%]), azithromycin alone, 33/147 (22.4% [95% CI: 16.0%-30.1%]), and neither drug, 108/409 (26.4% [95% CI: 22.2%-31.0%]). In this multi-hospital assessment, when controlling for COVID-19 risk factors, treatment with hydroxychloroquine alone and in combination with azithromycin was associated with reduction in COVID-19 associated mortality. Prospective trials are needed to examine this impact.

27. **US Hydroxychloroquine, Chloroquine, and Azithromycin Outpatient Prescription Trends, October 2019 Through March 2020.** Shehab N, Lovegrove M, Budnitz DS, *JAMA Intern Med*. July 6, 2020. doi:10.1001/jamainternmed.2020.2594

<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2767895?resultClick=1>

Findings: In 1 month, approximately 300 000 additional patients received hydroxychloroquine from retail pharmacies, including an approximate additional 93 000 patients who received both hydroxychloroquine and azithromycin. While some of the largest increases in hydroxychloroquine and chloroquine dispensing occurred in states with high COVID-19 case rates (eg, New Jersey, New York), other states with large increases in dispensing had moderate (eg, Florida) or low (eg, Hawaii) case rates.

28. **Regulatory T Cells for Treating Patients With COVID-19 and Acute Respiratory Distress Syndrome: Two Case Reports.** Gladstone DE, Kim BS, Mooney K, et al. *Ann Intern Med*. 2020 Jul 6. doi: 10.7326/L20-0681. <https://www.acpjournals.org/doi/10.7326/L20-0681>

Findings: Normally, regulatory T cells (Tregs) migrate into inflamed tissues, dampening inflammatory responses and hastening tissue repair. Adoptive Treg therapy has been effective in multiple preclinical models of ARDS. To our knowledge, this is the first report of human therapy with Tregs for ARDS mediated by COVID-19. We emphasize that the Tregs used were allogeneic, off-the-shelf, and CB Tregs and that both patients became critically ill despite receiving tocilizumab. We planned 3 infusions for each patient, with the first infusion on day 1, the second on day 3, and the third on day 7. Neither patient had an infusion reaction, inflammatory rebound, or other adverse reaction. We are planning a multicenter, randomized, double-blind, placebo-controlled trial of CB Tregs for ARDS associated with COVID-19.

## Transmission / Infection Control

29. **Prolonged Shedding of Severe Acute Respiratory Coronavirus Virus 2 (SARS-CoV-2) RNA Among Patients with Coronavirus Disease 2019 (COVID-19).** Ridgway JP, Shah NS, Robicsek AA. *Infect Control Hosp Epidemiol*. 2020 Jun 24;1-2. doi: [10.1017/ice.2020.307](https://doi.org/10.1017/ice.2020.307).

Findings: To estimate the duration of SARS-CoV-2 RNA shedding, we conducted a multisite study among patients who had nasopharyngeal specimens tested for SARS-CoV-2 RNA via real-time PCR assay at Providence St Joseph Health (a 51-hospital healthcare organization based in



Renton, Washington), University of Chicago Medicine in Chicago, Illinois, and NorthShore University HealthSystem. All patients with a positive SARS-CoV-2 PCR test between January 22, 2020, and April 23, 2020 who had at least 1 subsequent SARS-CoV-2 PCR test were included in the study. We found that SARS-CoV-2 RNA shedding persists for >3 weeks in most patients with COVID-19. This finding has important implications for infection prevention in both inpatient and outpatient settings.

**30. Visualizing the effectiveness of face masks in obstructing respiratory jets.** Vermaa S, Dhanakb M, Frankenfield J. *Physics of Fluids* 32, 061708 (2020);

<https://doi.org/10.1063/5.0016018> <https://aip.scitation.org/doi/10.1063/5.0016018>

Findings: We used qualitative visualizations of emulated coughs and sneezes to examine how material- and design-choices impact the extent to which droplet-laden respiratory jets are blocked. Loosely folded face masks and bandana-style coverings provide minimal stopping-capability for the smallest aerosolized respiratory droplets. Well-fitted homemade masks with multiple layers of quilting fabric, and off-the-shelf cone style masks, proved to be the most effective in reducing droplet dispersal. These masks were able to curtail the speed and range of the respiratory jets significantly, albeit with some leakage through the mask material and from small gaps along the edges. Importantly, uncovered emulated coughs were able to travel notably farther than the currently recommended 6-ft distancing guideline.

**31. Exposures before Issuance of Stay-at-Home Orders Among Persons with Laboratory-Confirmed COVID-19 — Colorado, March 2020.** Marshall K, Vahey GM, McDonald E, et al. *MMWR Morb Mortal Wkly Rep* 2020;69:847-849. DOI:

<http://dx.doi.org/10.15585/mmwr.mm6926e4>

[https://www.cdc.gov/mmwr/volumes/69/wr/mm6926e4.htm?s\\_cid=mm6926e4\\_w](https://www.cdc.gov/mmwr/volumes/69/wr/mm6926e4.htm?s_cid=mm6926e4_w)

Findings: Among 600 randomly selected COVID-19 patients 364 participated in study. The median age of participants was 50 years (34–64 years), and 187 (51%) were male. Among all participants, 27% reported known contact with at least one person with laboratory-confirmed COVID-19. Among the 73% of participants without known contact with a laboratory-confirmed COVID-19 patient, 30% reported contact with a person they knew who had fever or respiratory symptoms. The most commonly reported activities in the 2 weeks before becoming ill included attending gatherings of >10 persons (44%), traveling domestically (29%), working in a health care setting (28%), visiting a health care setting not as a health care worker (23%), and using public transportation (22%).

**32. Decontamination Methods for Reuse of Filtering Facepiece Respirators.** Su-Velez BM, Maxim T, Long JL, et al. *JAMA Otolaryngol Head Neck Surg.* 2020 Jul 2. doi:

10.1001/jamaoto.2020.1423. <https://jamanetwork.com/journals/jamaotolaryngology/article-abstract/2767783>

Findings: The filtration properties and fit of N95 respirators must be preserved to function adequately over multiple uses. Studies have shown that chemical sterilization using soap and water, alcohols, and bleach render the respirator nonfunctional. Decontamination with microwave heat and high dry heat also result in degradation of respirator material. UV light,

steam, low-dry heat, and commercial sterilization methods with ethylene oxide or vaporized hydrogen peroxide appear to be viable options for successful decontamination. Furthermore, since the surface viability of the novel coronavirus is presumed to be 72 hours, rotating N95 respirator use and allowing time decontamination of the respirators is also a reasonable option. We describe a protocol and best practice recommendations for redoffing decontaminated N95 and rotating N95 respirator use.

33. **Using heat to kill SARS-CoV-2.** Abraham JP, Plourde BD, Cheng L. *Rev Med Virol.* 2020 Jul 2:e2115. doi: 10.1002/rmv.2115. <https://onlinelibrary.wiley.com/doi/10.1002/rmv.2115>  
Findings: We review the currently existing literature on thermal inactivation of SARS-CoV-2 and present preliminary guideless on temperatures and exposure durations required to sterilize. We also compare these temperatures/exposure durations with potential household appliances that may be thought capable of performing sterilization.
34. **Importance of face masks for COVID-19 - a call for effective public education.** Tso RV, Cowling BJ. *Clin Infect Dis.* 2020 Jul 2:ciaa593. doi: 10.1093/cid/ciaa593. <https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa593/5866410>  
Findings: Misconceptions and stigmatization towards the use of face masks may hinder the containment of the COVID-19 pandemic. We address this previous debate by analyzing the advice on the community use of masks across different credible health authorities: countries that promoted the use of masks acknowledged that masks are effective, but also explained the importance of their proper use along with other hygiene measures. In contrast, authorities that recommended against the community use of masks mainly cited shortage of supplies, the argument that the public do not have the adequate skills to wear them, or that wearing masks might reduce compliance with other important behaviors. We suggest promoting effective behavioral changes in personal protective measures by teaching microbiological knowledge instead of just listing out the "dos-and-don'ts".
35. **Increasing Temperature and Relative Humidity Accelerates Inactivation of SARS-CoV-2 on Surfaces.** Biryukov J, Boydston JA, Dunning RA, et al. *mSphere.* 2020 Jul 1;5(4):e00441-20. doi: 10.1128/mSphere.00441-20. <https://msphere.asm.org/content/5/4/e00441-20>  
Findings: We have developed a simple mathematical model that can be used to estimate virus decay on nonporous surfaces under a range of conditions and which may be utilized operationally to identify indoor environments in which the virus is most persistent.
36. **Association between mobility patterns and COVID-19 transmission in the USA: a mathematical modelling study.** Badr HS, Du H, Marshall M, et al. *Lancet Infect Dis* 2020 Jul 1. doi: [https://doi.org/10.1016/S1473-3099\(20\)30553-3](https://doi.org/10.1016/S1473-3099(20)30553-3)  
[https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(20\)30553-3/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30553-3/fulltext)  
Findings: Our analysis revealed that mobility patterns are strongly correlated with decreased COVID-19 case growth rates for the most affected counties in the USA. Additionally, the effect of changes in mobility patterns, which dropped by 35–63% relative to the normal conditions, on COVID-19 transmission are not likely to be perceptible for 9–12 days, and potentially up to 3

weeks, which is consistent with the incubation time of SARS-CoV-2 plus additional time for reporting. We also show evidence that behavioural changes were already underway in many US counties days to weeks before state-level or local-level stay-at-home policies were implemented, implying that individuals anticipated public health directives where social distancing was adopted, despite a mixed political message. This study strongly supports a role of social distancing as an effective way to mitigate COVID-19 transmission in the USA. Until a COVID-19 vaccine is widely available, social distancing will remain one of the primary measures to combat disease spread, and these findings should serve to support more timely policy making around social distancing in the USA in the future.

- 37. Investigation of Nosocomial SARS-CoV-2 Transmission from Two Patients to Health Care Workers Identifies Close Contact but Not Airborne Transmission Events.** Bays DJ, Nguyen MH, Cohen SH, et al. *Infect Control Hosp Epidemiol.* 2020 Jul 3;1-22. [doi: 10.1017/ice.2020.321](https://doi.org/10.1017/ice.2020.321). Findings: Two separate index patients were admitted in without initial suspicion for COVID-19 and without contact or droplet precautions in place; both patients underwent several aerosol generating procedures. A total of 421 health care workers were exposed, and the results of the case contact investigations identified 8 secondary infections in health care workers. In all 8 cases, the staff had close contact with the index patients without sufficient personal protective equipment. Despite multiple aerosol generating procedures, there was no evidence of airborne transmission. These observations suggest that, at least in a healthcare setting, a majority of SARS-CoV-2 transmission is likely to take place during close contact with infected patients through respiratory droplets, rather than by long-distance airborne transmission.

### Whole Person Care

- 38. The Urgency of Spiritual Care: COVID-19 and the Critical Need for Whole-Person Palliation.** Ferrell BR, Handzo G, Picchi T, et al. *J Pain Symptom Manage.* 2020 Jul 3;S0885-3924(20)30578-9. [doi: 10.1016/j.jpainsymman.2020.06.034](https://doi.org/10.1016/j.jpainsymman.2020.06.034).
- 39. COVID Stress Syndrome: Concept, Structure, and Correlates.** Taylor S, Landry CA, Paluszek MM, et al. *Depress Anxiety.* 2020 Jul 5. [doi: 10.1002/da.23071](https://doi.org/10.1002/da.23071). Findings: Five correlated facets of COVID-19-related distress cohere to form a COVID stress syndrome: (a) Fear of the dangerousness of COVID-19, which includes fear of coming into contact with fomites potentially contaminated with SARSCoV2, (b) worry about socioeconomic costs of COVID-19 (e.g., worry about personal finances and disruption in the supply chain), (c) xenophobic fears that foreigners are spreading SARSCoV2, (d) traumatic stress symptoms associated with direct or vicarious traumatic exposure to COVID-19 (nightmares, intrusive thoughts, or images related to COVID-19), and (e) COVID-19-related compulsive checking and reassurance seeking. Further research is needed to determine whether the syndrome will abate once the pandemic has passed or whether, for some individuals, it becomes a chronic condition.

### Women & Children

40. **Multisystem Inflammatory Syndrome in U.S. Children and Adolescents.** Feldstein LR, Rose EB, Horwitz SM, et al. *N Engl J Med*. 2020 Jun 29. doi: 10.1056/NEJMoa2021680.  
<https://www.nejm.org/doi/full/10.1056/NEJMoa2021680>  
Findings: We report on 186 patients with MIS-C in 26 states. The median age was 8.3 years, 115 patients (62%) were male, 135 (73%) had previously been healthy, 131 (70%) were positive for SARS-CoV-2 by RT-PCR or antibody testing, and 164 (88%) were hospitalized after April 16, 2020. Organ-system involvement included the gastrointestinal system in 171 patients (92%), cardiovascular in 149 (80%), hematologic in 142 (76%), mucocutaneous in 137 (74%), and respiratory in 131 (70%). The median duration of hospitalization was 7 days (interquartile range, 4 to 10); 148 patients (80%) received intensive care, 37 (20%) received mechanical ventilation, 90 (48%) received vasoactive support, and 4 (2%) died. Coronary-artery aneurysms (z scores  $\geq 2.5$ ) were documented in 15 patients (8%), and Kawasaki's disease-like features were documented in 74 (40%). Most patients (171 [92%]) had elevations in at least four biomarkers indicating inflammation. The use of immunomodulating therapies was common: intravenous immune globulin was used in 144 (77%), glucocorticoids in 91 (49%), and interleukin-6 or 1RA inhibitors in 38 (20%). Multisystem inflammatory syndrome in children associated with SARS-CoV-2 led to serious and life-threatening illness in previously healthy children and adolescents.
41. **Clinical Implications of SARS-CoV-2 Infection in the Viable Preterm Period.** Gulersen M, Blitz MJ, Rochelson B, et al. *Am J Perinatol*. 2020 Jul 2. doi: 10.1055/s-0040-1713851.  
<https://www.thieme-connect.com/products/ejournals/abstract/10.1055/s-0040-1713851>  
Findings: The likelihood of PTB during hospitalization with SARS-CoV-2 infection is significantly lower among women diagnosed in the early preterm period compared with late preterm. Most women with SARS-CoV-2 infection in the early preterm period recovered and were discharged home. The majority of PTB were indicated and not due to spontaneous preterm labor.
42. **Cardiac workup and monitoring in hospitalised children with COVID- 19.** Fremed MA, Lytrivi ID, Liberman L, et al. *Cardiol Young*. 2020 Jul 2:1-4. doi: 10.1017/S1047951120001778.  
Findings: We share the approach to the cardiac workup and monitoring utilised at a large congenital heart center in New York City.
43. **Vertical transmission risk of SARS-CoV-2 infection in the third trimester: a systematic scoping review.** Thomas P, Alexander PE, Ahmed U, et al. *J Matern Fetal Neonatal Med*. 2020 Jul 1:1-8. doi: 10.1080/14767058.2020.1786055.  
<https://www.tandfonline.com/doi/full/10.1080/14767058.2020.1786055?af=R>  
Findings: 18 studies met the inclusion criteria, consisting of 157 mothers and 160 neonates. The mean age of the pregnant patients was 30.8 years and the mean gestational period was 37 weeks and 1 d. Currently there is currently no conclusive evidence to suggest that vertical transmission of SARS-CoV-2 occurs. Amongst 81 (69%) neonates who were tested for SARS-CoV-2, 5 (6%) had a positive result. However, amongst these 5 neonates, the earliest test was performed at 16 h after birth, and only 1 neonate was positive when they were later re-tested. However, this neonate initially tested negative at birth, suggesting that the SARS-CoV-2

infection was likely hospital-acquired rather than vertically transmitted. 13 (8%) neonates had complications or symptoms. The findings of this rapid descriptive review based on early clinical evidence suggest that vertical transmission of SARS-CoV-2 from mother to neonate/newborn did not occur.

44. **Universal SARS-Cov-2 Screening in Women Admitted for Delivery in a Large Managed Care Organization.** Fassett MJ, Lurvey LD, Yasumura L. *Am J Perinatol*. 2020 Jul 3. doi: 10.1055/s-0040-1714060. <https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0040-1714060>  
Findings: Of women delivered during the study period, 3,923 (99.0%) underwent SARS-CoV-2 testing. The prevalence of SARS-CoV-2 infection in a large diverse cohort of term pregnant women in Los Angeles county was 0.43%. All women with positive test results were asymptomatic at the time of testing.
45. **Attitudes and Psychological Factors Associated with News Monitoring, Social Distancing, Disinfecting, and Hoarding Behaviors Among US Adolescents During the Coronavirus Disease 2019 Pandemic.** Oosterhoff B, Palmer CA. *JAMA Pediatr*. 2020 Jun 29. doi:10.1001/jamapediatrics.2020.1876. <https://jamanetwork.com/journals/jamapediatrics/fullarticle/2767276>  
Findings: The sample included 770 adolescents collected via convenience sampling (mean [SD] age, 16.3 [1.1] years; 575 girls [74.7%]). Many teens reported not engaging in pure social distancing, but they were monitoring the news and disinfecting daily. Some teens reported hoarding. Attitudes about the greater severity of COVID-19 were associated with more social distancing, disinfecting, and news monitoring but also more hoarding. The results of this survey study suggest that emphasizing the severity of COVID-19 and the social implications of pandemic-related behaviors may be important for teens, particularly for those who are not following preventive health behaviors or who are engaging in hoarding.

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## GUIDELINES & CONSENSUS STATEMENTS

**ACMT Position Statement: Medication Administration and Safety During the Response to COVID-19 Pandemic.** *J Med Toxicol*. 2020 Jul 3. doi: 10.1007/s13181-020-00794-4

**RSNA Expert Consensus Statement on Reporting Chest CT Findings Related to COVID-19: Interobserver Agreement Between Chest Radiologists.** *Can Assoc Radiol J*. 2020 Jul 2;846537120938328. doi: 10.1177/0846537120938328

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## FDA / CDC / NIH/ WHO Updates

AHA, AMA, ANA [Open Letter Urging Public to Wear a Mask to Stop COVID-19 Spread](#)

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

EPA - [EPA approves first surface disinfectant products tested on the SARS-CoV-2 virus](#)

WHO - [WHO discontinues hydroxychloroquine and lopinavir/ritonavir treatment arms for COVID-19](#)

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## Commentary

[Why N95 Should Be the Standard for All COVID-19 Inpatient Care](#). Dau NQ, Peled H, Lau H, Lyou J, Skinner C. *Ann Int Med*. June 29, 2020.

[Comparing SARS-CoV-2 with SARS-CoV and influenza pandemics](#). Peterson, E, Koopmans, M, et al. *The Lancet Infectious Diseases*. July 3, 2020.

[It is Time to Address Airborne Transmission of COVID-19](#). Morawska L, Milton DK + 239 scientists. *Clinical Infectious Diseases* July 6, 2020. <https://doi.org/10.1093/cid/ciaa939>

See more here: [239 Experts With One Big Claim: The Coronavirus Is Airborne - The New York Times](#)

[Taking a Closer Look at COVID-19, Health Inequities, and Racism](#). Abbasi J. *JAMA*. 2020 Jun 29. doi: 10.1001/jama.2020.11672.

[The Disproportionate Impact of Covid-19 on Communities of Color](#). Sequist, T.D. *NEJM Catalyst*. 2020 July 6.

[Impact of SARS-CoV-2 on Hospital Acquired Infection Rates in the United States: Predictions and Early Results](#). McMullen KM, Smith BA, Rebman T. *Am J Infect Control* 2020 Jul 1;S0196-6553(20)30634-9

[Mortality in COVID-19 patients treated with ACEIs/ARBs: Re-estimated meta-analysis results following the Mehra et al. Retraction](#). Alamer A. *Pharmacological Research*. 2020; 160 105053 <https://doi.org/10.1016/j.phrs.2020.105053>

[Telemedicine Services During COVID-19: Considerations for Medically Underserved Populations](#). Woodall T, Ramage M, LaBruyere JT, et al. *J Rural Health*. 2020 Jul 2. doi: 10.1111/jrh.12466.

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