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2020-05-09/10 DAILY UNM GLOBAL HEALTH COVID-19 BRIEFING

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DAILY UNM GLOBAL HEALTH COVID-19 BRIEFING

May 10, 2020

Executive Summary

NM gets remdesivir. NM case update. Dental services resume. NM prison testing. Educator age risk. Stuart Kauffman dashboard. Long-term care fatalities. Fauci in quarantine. US farmer support. US vaccinations down. South Korea bar shutdown. German rebound lockdown easing. Managing glove skin reactions. Neurosurgery down 70%. Impact airline travel ban. CDC meat packing report. UK distancing impact. 9-day incubation. Low fatality rate estimates. Improving social connection. Social distancing and mask use effective. Parents under stress. Nurse psychological stress. Israel Internal Medicine Tx strategies. Education management. Recommendations are given on endoscopy procedures, management of adrenal insufficiency and of IBD, on re-introduction of cardiovascular services, and respiratory PPE for healthcare workers. Guidelines for medical examiners, coroners, and pathologists. Successful GI department re-opening in China. FDA: serology testing performance. First antigen test approved. FFPE SARS-CoV-2 detection. Triple antiviral therapy effective. Respiratory rehabilitation effective. Targeting inflammatory cascade. Negative HCQ observational study. Chloroquine G6PD risk. Interferon inhibits replication – mouse. Tocilizumab benefit: uncontrolled study. Most trials in HCQ, remdesivir. NKG2A treatment target. In silico antiviral peptides. Chinese medicine review. Cell entry mechanisms. Olfactory viral entry. Higher female immune response. Immune checkpoints. Metagenomic analysis. ¼ hospitalized no risk factors. High RDW mortality. Mortality: vitamin D. Deaths of despair. Optimism and exercise.

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NM Highlights

- [Remdesivir on its way to New Mexico](#)

New Mexico Senator Martin Heinrich announced Saturday that the state will soon receive its first shipment of remdesivir, an antiviral drug that could modestly speed recovery in patients infected with the coronavirus. Heinrich has reportedly been working with UNMH and the New Mexico Department of Health to secure remdesivir for the state. He said drugmaker Gilead will be making its first shipment of the drug to New Mexico on Monday.

- [NM reports 9 more COVID-19 deaths and 87 additional cases on May 10 according to partial report](#)

As of today (5/10), the total positive cases and total deaths in the state are 4,863 and 200, respectively. The state has performed 102,498 tests, there are 194 individuals currently hospitalized for COVID-19, and 1,285 COVID-19 cases have recovered. [New NMDOH portal featuring epidemiologic breakdown of cases](#).

- [Non-essential dental services resume in most parts of NM](#)

Dentists in New Mexico in all but San Juan, McKinley and Cibola counties resume care while complying to guidelines and wearing proper PPE. Dentists can use a personal protective equipment burn rate calculator to determine how quickly they

choose to use PPE.

- [NMDOH complete testing in NM Corrections Department in 11 prisons](#)

As of May 8, all 2,486 facility staffs have been tested. The few staff that were unavailable will be tested before returning to work. The target to test 25% of inmate population is on track to be completed by May 11. So far, more than 800 inmates have been tested.

- [High fraction of educators in higher risk age group for COVID-19](#)

American Enterprise Institute Report: Federal data show that about 18 percent of all teachers and 27 percent of all principals are older than age 55. That age group accounts for about 92 percent of deaths in the United States due to COVID-19. NM ranks 2nd highest for teachers (25%) and 5th highest for principals (34%). This poses challenge to school reopening, while trying keep the vulnerable older population of educators protected.

- [Dashboard data shows decline in New Mexico daily case rate](#)

The Santa Fe New Mexican and Stuart Kauffman, an emeritus professor at the University of Pennsylvania teamed up to develop a dashboard of the rolling growth rate in confirmed COVID-19 cases. NM's rate of growth in number of confirmed cases fell from 23.5% to 4.2% per day since stay-at-home orders were put in place. The dashboard does not take the number of COVID tests/day in each state, which could skew some of the results.

US Highlights

- [Significant reduction of routine pediatric vaccine ordering and administration](#)

Researchers from CDC used internal vaccine provider order data and vaccine administration data to assess routine vaccination coverage in pediatric population before and during the COVID-19 pandemic. They observed a more than 50% reduction of vaccine administration in children younger than 24 months and more than 90% reduction in children older than 24 months. The decline might indicate that U.S. children and their communities face increased risks for outbreaks of vaccine-preventable diseases. Continued coordinated efforts between health care providers and public health officials at the local, state, and federal levels will be necessary to achieve rapid catch-up vaccination.

- [Long-term care facilities account for at least a third of COVID-19 fatalities in many US states](#)

As per the data published by the Kaiser Family Foundation, coronavirus fatalities in nursing homes, adult care residences, and other skilled nursing care settings account for at least a third of the deaths in 26 states and more than half in 14 of those. According to the report, New Hampshire and Pennsylvania reported the highest share of coronavirus deaths — 72% and 70% respectively.

- [Dr. Anthony Fauci and two others in quarantine](#)

Three members of the White House coronavirus task force, Dr. Anthony Fauci (the director of the National Institute of Allergy and Infectious Diseases), Dr. Robert Redfield (director of the Centers for Disease Control and Prevention), and Stephen Hahn (the commissioner of the Food and Drug Administration), placed themselves in quarantine after contact with someone who tested positive for COVID-19. All three men had a “low risk exposure” to a person at the White House and are scheduled to testify before a Senate committee Tuesday.

- [U.S. Department of Agriculture will use \\$16 billion from the CARES Act to support farmers](#)

The federal government rolled out programs to help agricultural producers during the pandemic. The New Mexico Farmers Market Association also set up a grant fund to help local farmers who had lost business. The organization had \$110,000 to award in individual and collaborative grants.

International Highlights

- [Virus cluster prompts Seoul to close bars after South Korea eases limits](#)

Just the fourth day of the reopening phase, the mayor of Seoul ordered all the capital's bars and nightclubs shut down indefinitely after the discovery of a cluster of dozens of coronavirus infections.

- [Rate of infection rises sharply after easing of lockdown in Germany](#)

The coronavirus reproduction rate in Germany rose from .65 to 1.1, just days after federal and regional authorities eased restraints. Keeping the patient reproduction rate down is decisive, say epidemiologists.

Economics, Workforce, Supply Chain, PPE Highlights

- [Managing skin reactions to gloves during the COVID-19 pandemic](#)

Letter to the Editor: Recommendations for the prevention of allergic reactions to gloves are summarized: wash hands after removal with mild soap and dry thoroughly, do not use oil-based hand creams, do not use wet gloves or with wet hands, use cotton inner liner, treat underlying hand eczema, and use powder-free gloves. Nitrile and latex gloves are preferred due to better durability. Health care workers are also encouraged to wear double gloves when handling COVID-19 patients' airways, blood, urine, and other body fluids. The outer glove should be the first equipment to be removed.

- [Neurosurgeon survey finds more than 70% overall reduction of surgeries](#)

A global survey of neurosurgeons (n=446) showed surgical planning was changed in most institutions (92%) and dedicated in-hospital routes were created for positive patients (58%). Patient screening was performed only when there were symptoms (57%) and not routinely before surgery (18%). Health professionals were rarely screened (20%) and were sometimes asked to work if asymptomatic (26%).

- [Airplane travel ban and its socio-economic impact](#)

To study the effects of air travel ban on aviation and in turn its socio-economic, several scenarios are constructed based on past pandemic crisis and the observed flight volumes. According to these hypothetical scenarios, in the first Quarter of 2020 the impact of aviation losses could have negatively reduced the world GDP by 0.02% to 0.12% according to the observed data and, in the worst-case scenarios, at the end of 2020 the loss could be as high as 1.41-1.67% and job losses may reach 25-30 million. Focusing on EU27, the GDP loss may amount to 1.66-1.98% by the end of 2020 and the number of job losses 4.2-5 million in the worst-case scenarios. Some countries will be more affected than others in the short run and most European airlines companies will suffer from the travel ban.

Epidemiology Highlights

- [CDC report on COVID-19 among meat and poultry processing facilities](#)

Qualitative data was gathered on 115 meat or poultry processing facilities in 19 states by CDC. COVID-19 was diagnosed in 4,913 (approximately 3%) workers, and 20 COVID-19-related deaths were reported. Barriers to COVID-19 prevention include, difficulty in keeping 6 feet apart, following disinfection guidelines, and socioeconomic challenges in workers who might still work while ill. Methods implemented to help decrease spread include screening programs, face coverings, and disinfection of high-touch surfaces.

- [Physical distancing measures in UK shown to reduce contacts and R0](#)

A survey (n=1356) in the UK evaluated sufficiency of physical distancing measures. Average daily contacts per participant was reduced by 74% (from 10.8 to 2.8). The authors state this would reduce R0 from 2.6 prior to lockdown to 0.62 (95% CI = 0.37-0.89) after the lockdown, based on all types of contact and 0.37 (95% CI = 0.22-0.53) for physical (skin to skin) contacts only.

- [Median incubation period for Wuhan could be affected by travel history](#)

Patients with clear epidemiological survey information and illness development timelines (N=2555) were categorized into five groups by their travel histories. The median incubation period for all patients infected outside Wuhan was 9 days compared to the 5-day incubation period that was based on patients in Wuhan.

- [One estimate of case fatality rate is <0.1-7.7%](#)

The authors used partial identification analysis to estimate the number infected and number of mortalities. The analysis model assumes likely estimates for number of people thought to be infected, but not tested, and the number of false negatives. The authors use data from Illinois, New York, and Italy from March 16th through April 24th to estimate case fatality rates of [0.1-3.3%] for Illinois, [0.1-4.9%] for New York, and [0.1-7.7%] for Italy.

Healthcare Policy Recommendations

- [5-point strategy for improved connection between patient, family, and provider](#)

With the relentless workload experienced by healthcare workers, family-centered care has not been implemented as frequently. In an attempt to decrease provider, patient, and family stress, authors suggest a 5-point strategy to foster a positive connection between those involved. 1. Allow closest family to visit with optimal PPE. 2. Informative written letters and phone calls to families from provider. 3. Routine calls from non-provider (volunteer, medical student, etc) to maintain communication and allow families to contact nurses and providers once a day. 4. Web-based communication/conferences. 5. Allow family to be with patient at end of life if possible and use web-based approaches as second option.

- [Universal masking is urgent](#)

An international team of researchers from US, UK, France, and Finland have released the results of two comprehensive simulation models (SEIR and Monte Carlo) predicting the impact of universal face mask wearing upon the spread of the SARS-CoV-2 virus. To validate these theoretical models, they compare their predictions against a new empirical data set they have collected that includes whether regions have universal masking cultures or policies, their daily case growth rates, and their percentage reduction from peak daily case growth rates. Results show a near perfect correlation between early universal masking and successful suppression of daily case growth rates and/or reduction from peak daily case growth rates. The authors conclude that social distancing combined with >80% of population wearing masks would result in a substantial reduction of infection, with eventually eliminating the disease, and provide 6 key policy recommendations for achieving that.

- [First things first: parent psychological flexibility and self-compassion](#)

Parents are currently under extreme levels of stress. This article describes an “evolutionary mismatch,” in which the ways people had previously adapted to live are suddenly no longer effective. Practitioners must treat patients with compassion and emphasize the importance of self-care.

- [Survey of psychological stress in Wuhan ICU nurses](#)

Nurses around the world have been experiencing overwhelming psychological pressures. A Wuhan survey of ICU nurses (n=85) found decreased appetite or indigestion (59%), fatigue (55%), difficulty sleeping (45%), nervousness (28%), frequent crying (26%), and even suicidal thoughts (2%). Knowing the cost to nurses' immunity, measures were taken. These included but were not limited to: psychologist intervention, drawing and singing exercises, and the use of WeChat to create support groups.

- [Recommendations for patients hospitalized in internal medicine departments](#)

Israel authors (Corona Department Heads) suggest a management scheme for COVID-19 patients according to clinical manifestations and current evidence, primarily based on our accumulating experience.

- [Recommendations for educational facilities](#)

Universities around the globe face several challenges: lack of technological resources or knowledge with transition to online learning, difficulties in assessment and evaluation, needs of international students, travel restriction, and mental health decline due to separation and uncertainty. Authors recommend support services from universities, cancellation of near-future events, training programs for faculty on online platform-use, and clear instructions on assignment/testing standards.

Practice Guidelines

- [A review of guidelines on nasal, pharyngeal and laryngeal endoscopy procedures](#)

A literature review showed that 24 societies suggested to perform endoscopy procedures only if strictly necessary; one society recommended to avoid flexible endoscopy in all cases. All national and international societies recommended the rational use of PPE during the diagnostic procedures such as disposable gowns, gloves, FFP2 or N95 respirators and surgical masks, and eye protection (goggles or face shield).

- [Management of adrenal insufficiency during COVID-19 pandemic](#)

UK authors highlight the need for education (sick day rules, stringent social distancing rules), equipment (sufficient glucocorticoid supplies, steroid emergency self-injection kit) and empowerment (steroid emergency card, COVID-19

guidelines) to prevent adrenal crises. In patients with adrenal insufficiency developing an acute COVID-19, which frequently presents with continuous high fever, they suggest oral stress dose cover with 20mg hydrocortisone every six hours. They also comment on suggested dosing for patients who usually take modified release hydrocortisone or prednisolone. In patients showing clinical deterioration during an acute COVID-19, they advise immediate (self-)injection of 100mg hydrocortisone intramuscularly, followed by continuous intravenous infusion of 200mg hydrocortisone per 24 hours, or until this can be established, administration of 50mg hydrocortisone every 6 hours.

- [Managing Inflammatory Bowel Disease: recommendations of gastrointestinal societies](#)

A review of guidelines showed that all societies recommend continuing IBD-specific treatment as risk of active disease is perceived to be higher than the uncertain risks of immunosuppression predisposing to COVID-19. Minimizing corticosteroid exposure by rapid tapering whenever possible is universally recommended, with some societies additionally suggesting topical corticosteroids or exclusive enteral nutrition as alternatives for patients experiencing a flare. Thiopurine initiation is discouraged due to increased risk of viral infection and need for concomitant induction corticosteroid. Caution is needed with initiating combination therapy. Some societies suggest stopping thiopurine treatment in patients ≥ 65 years and those with significant comorbidities in stable remission. For patients commencing biological therapy, subcutaneously administered drug may be preferred based on local circumstances to maximize social distancing efforts. Forced switching to subcutaneous biologics should only be used in centers unable to provide infusions. There are no data to favor one class of biologics over another in the context of COVID-19.

- [Guidance from the North American Society for reintroduction of cardiovascular services](#)

Specific recommendations are given on the following: STEMI, Acute Coronary Syndrome, Elective Cath Lab Cases, Transcatheter aortic valve replacement, MitraClip, ASD/PFO, Left atrial appendage closure, Coronary Surgery, Valve Surgery, other cardiac surgery, Ablation, Device placement, Echocardiography, Cardiac CT, Cardiac MRI, Nuclear Cardiac Imaging, cardiopulmonary testing, endomyocardial biopsy, R Heart Catheterization, vascular services for critical limb ischemia, aortic aneurysm Repair, and other vascular issues.

- [Recommendations for respiratory protective equipment for health care workers](#)

Discrepancies on guidance from health authorities for health care workers' respiratory protective equipment (RPE) are discussed. The authors suggest continuous use of N95 respirators during health care worker shifts. In lieu of the respirators, constant use of surgical masks during clinical care with suspected or confirmed cases is recommended by the authors.

- [CDC updated guidance for medical examiners, coroners, and pathologists](#)

The changes include recommendations for optimal autopsy tissue specimen collection, including number of recommended sections from high yield respiratory tissues; acceptable alternatives to nasopharyngeal swabs; timing considerations when collecting a swab; considerations regarding serologic testing, and patient transportation.

- [Gastroenterology department in Ganzgzhou reopens to full capacity without nosocomial infection](#)

A gastroenterology department gradually resumed full outpatient operations without nosocomial cases, as of April 24th, by screening all patients by symptoms, rtPCR, and chest CT. Patients were scheduled 30 minutes apart and were asked to keep 1 meter distance between themselves and others. Inpatient visitors were allowed with negative rtPCR and patients who developed a fever while admitted were retested with rtPCR. As of April 24th, inpatient census is at 50% pre-pandemic levels.

Testing

- [FDA Report: EUA Authorized Serology Test Performance](#)

FDA summarized the expected performance of 12 serology tests used to detect the presence of SARS-CoV-2 antibodies. Four criteria are reported: "sensitivity" (ability to identify those with antibodies to SARS-CoV-2, or true positive rate); "specificity" (ability to identify those without antibodies to SARS-CoV-2, or true negative rate); as well as the test's Positive and Negative Predictive values (PPV and NPV). With the caveat that the prevalence of SARS-CoV-2 antibody positive individuals in the U.S. population is currently unknown, and may change based on the duration the virus is in the country and the effectiveness of mitigations, the two top tests were as follows: "Elecsys Anti-SARS-CoV-2" from Roche (sensitivity 100%, specificity 99.8%, PPV at prevalence 5%, 96.5%, NPV at prevalence 5%, 100%) and "Architect SARS-CoV-2 IgG" from Abbott (sensitivity 100%,

specificity 99.6%, PPV at prevalence 5%, 92.9%, NPV at prevalence 5%, 100%).

- [FDA authorizes first antigen test for rapid detection of coronavirus](#)

FDA has issued the first emergency use authorization for a COVID-19 antigen test, a new category of tests for use in the ongoing pandemic. These diagnostic tests quickly detect fragments of proteins found on or within the virus by testing samples collected from the nasal cavity using swabs for point-of-care testing. The main advantages of an antigen test is the speed of the test, which can provide results in minutes. Also, positive results from antigen tests are highly accurate, but there is a higher chance of false negatives, so negative results do not rule out infection, and need to be confirmed with a slower PCR test. Antigen tests are also important in the overall response against COVID-19 as they can generally be produced at a lower cost than PCR tests and once multiple manufacturers enter the market, can potentially scale to test millions of Americans per day due to their simpler design.

- [Molecular detection of SARS-CoV-2 in formalin fixed paraffin embedded specimens](#)

The authors describe laboratory techniques and reagents for identifying SARS-CoV-2 in infected formalin fixed paraffin embedded (FFPE) cell pellets. They describe processes for detection of virus using immunohistochemistry (IHC), immunofluorescence assay (IFA), RNAscope in situ hybridization, and multiplex fluorescence ISH (mFISH). These techniques and reagents can be used in studies in humans and in COVID-19 animal models.

Drugs, Vaccines, Therapies, Clinical Trials

- [Phase 2 RCT of IFN beta-1b, lopinavir–ritonavir, and ribavirin triple therapy yield statistically significant decrease in viral shedding](#)

This randomized controlled trial assessed patients from 6 Hong Kong hospitals. 86 were randomly assigned to the combination group and 41 were assigned to the lopinavir-ritonavir control group. The combination group received a 14-day regimen of lopinavir 400 mg and ritonavir 100 mg q12h, ribavirin 400 mg q12h, and 3 doses of 8 million IU of interferon beta-1b on alternate days. The control group received 14 days of lopinavir 400 mg and ritonavir 100 mg q12h. The combination group had a shorter median time (7 days) from start of study treatment to negative nasopharyngeal swab compared to control group (12 days). HR=4.37, (95% CI 1.86-10.24), p value = 0.0010. Researchers concluded that early triple antiviral therapy was safe and superior to lopinavir–ritonavir alone in shortening the duration of viral shedding in patients with mild to moderate COVID-19. The study did not have a placebo group, which makes it impossible to assess the overall clinical benefit of the combination treatment.

- [Respiratory rehabilitation in elderly with COVID-19: A randomized controlled study](#)

This was a prospective, randomized open-label controlled study, recruiting 72 elderly participants, of which 36 were randomly underwent respiratory rehabilitation, with the others getting no treatment. Six-week respiratory rehabilitation improved respiratory function, quality of life and anxiety of elderly patients with COVID-19, but it had little improvement in depression.

- [Targeting the inflammatory cascade with IL-1 blockade in moderate to severe COVID-19 pneumonia](#)

Case series of 9 adult patients with moderate-to-severe COVID-19 pneumonia who were treated with anti-IL-1 blocking by anakinra in an attempt to prevent exaggerated host immune response. This proof-of-concept study showed promising results and should help encourage larger controlled studies to investigate effectiveness of IL-1 blockade in the treatment of COVID-19.

- [No association between hydroxychloroquine use and intubation or death](#)

NEJM: This is an observational study of 1376 patients, approximately half of whom received hydroxychloroquine. Patients were matched via a propensity scoring system for multiple known risk factors, initial status, and other treatments patient received. The authors of this observational study report no significant association between hydroxychloroquine use and intubation or death with hazard ratio 1.04 (95% CI: 0.82-1.32). The authors acknowledge the need for randomized control trials using hydroxychloroquine.

- [Use of chloroquine and potential adverse outcomes in G6PD deficient patients](#)

Based on studies done on the hemolytic effect of chloroquine use in G6PD deficient individuals, caution should be taken in using it in treatment of patients unaware of their deficiency status yet infected with the virus. Chloroquine and the potential adverse outcome in undiagnosed G6PD-deficient cases infected with COVID-19.

- [Interferon lambda-1a inhibits SARS-CoV-2 replication in novel mouse model of COVID-19](#)

In a manuscript posted on bioRxiv, researchers from Stanford and University of North Carolina describe the development of a new mouse model for COVID-19 where disease was more severe in aged mice. They also demonstrate that clinical candidate interferon lambda-1a can potentially inhibit SARS-CoV-2 replication in primary human airway epithelial cells in vitro, and both prophylactic and therapeutic administration diminished replication of virus in mice. A [randomized clinical trial](#) of the new therapy has started enrolling 120 patients at Stanford University.

- [Tocilizumab for severe COVID-19 pneumonia: uncontrolled series study](#)

A prospective series of 100 inpatients with COVID-19 pneumonia and ARDS requiring ventilatory support was analyzed to determine whether intravenous administration of tocilizumab (TCZ), a monoclonal antibody that targets the interleukin 6 receptor, was associated with improved outcome. Out of 100 treated patients 43 received TCZ in the ICU, while 57 in the general ward as no ICU beds were available. Overall, at 10 days the respiratory condition was improved or stabilized in 77 (77%) of patients, of whom 61 showed a significant clearing of diffuse bilateral opacities on chest x-ray and 15 were discharged from the hospital. Respiratory condition worsened in 23 (23%) patients, of whom 20 (20%) died. During the 10-day follow-up, three cases of severe adverse events were recorded: two patients developed septic shock and died, one had gastrointestinal perforation requiring urgent surgery and was alive at day 10. The response to TCZ was rapid, sustained, and associated with significant clinical improvement. The data stem from an uncontrolled series and a causal inference cannot be established.

- [Highest number of clinical trials being conducted on hydroxychloroquine, followed by remdesivir](#)

A systematic review of clinical drug trials showed that by the end of June we will have results of almost 20 trials involving 40000 patients for hydroxychloroquine and 5 trials with 4500 patients for remdesivir; however, low statistical power is expected from the 9 clinical trials testing the efficacy of favipiravir or the 5 testing tocilizumab, since each one will recruit less than 1000 patients.

- [NKG2A receptor and COVID-19: new potential treatment target](#)

A receptor on lymphocytes) is involved in host immune responses. On this basis, the authors hypothesize that the anti-NKG2A monoclonal antibody monalizumab, currently under active clinical development for the management of rheumatoid arthritis and several neoplastic disorders, could represent a viable way for treatment of patients with severe COVID-19 infection, characterized by a sudden and marked reduction of the antiviral activity of NK and CD8+ cells

- [In silico design of antiviral peptides targeting the spike protein of SARS-CoV-2](#)

The authors report the use of molecular dynamics simulation to design a peptide that can prevent the virus membrane from fusing with the host cell. The authors plan to continue to simulate the peptide with modification, and then test the blocking effect in cells and animal infections.

- [Clinical benefits of Chinese traditional medicines against COVID-19](#)

The present review summarizes the basic information, clinical evidence and published literatures of recommended CTMs against COVID-19.

Other Science

- [Cell entry mechanisms](#)

Researchers found that SARS-CoV-2 receptor binding domain (RBD) has higher hACE2 binding affinity than SARS-CoV RBD. However, the hACE2 binding affinity of the entire SARS-CoV-2 spike is comparable to or lower than that of SARS-CoV spike, suggesting that SARS-CoV-2 RBD, albeit more potent, is less exposed than SARS-CoV RBD. Finally, unlike SARS-CoV, cell entry of SARS-CoV-2 is pre-activated by proprotein convertase furin, reducing its dependence on target cell proteases for entry.

- [Mouse model shows viral molecules in olfactory epithelium are expressed more in males, older mice](#)

In mouse models, ACE2 is expressed more heavily in sustentacular cells in the Olfactory Epithelium (OE) with minimal expression in neurons. ACE2 is more heavily expressed in male mice and both ACE2 and TMPRSS2 is more heavily expressed in older individuals. The results suggest that virus accumulates in sustentacular cells first, interfering with their metabolism, which affects the function of olfactory receptor neurons.

- [Higher immune response in females](#)

Serum of 331 patients with SARS-CoV-2 was collected during hospitalization and checked for SARS-CoV-2 IgG antibody. Concentration of IgG antibody in mild, general and recovering patients showed no difference between male and female patients. Among those with severe status there were more female patients having a relatively high concentration of serum SARS-CoV-2 IgG antibody. In addition, the generation of IgG antibody in female patients was stronger than male patients in disease early phase. This may be an explanation of different outcome of COVID-19 between sex (higher severity and mortality in males).

- [Identification of immune checkpoints and potential for cancer drug repurposing](#)

Nature Review preprint: This is a longitudinal analysis of immune responses, including immune cell phenotyping and assessment of the soluble factors present in the blood and broncho-alveolar lavage fluid (BALF) of COVID-19 patients. The increased expression of NKG2A and PD-1 inhibitory receptors on T and natural killer (NK) cells suggest that therapeutic blocking antibodies targeting these molecules could be repurposed as first line of defense to promote SARS-CoV-2 clearance. The potential role of the C5a-C5aR1 axis in the pathophysiology of acute respiratory distress syndrome and the role of Avdoralimab are discussed.

- [Successful identification and recovery of SARS-CoV-2 genomes with viral and bacterial coinfections](#)

The analysis was performed with samples collected from Seattle, Washington. The results showed clear identification of a novel human betacoronavirus in laboratory-proven cases of SARS-CoV-2. A subset of samples also showed superinfection or colonization with human parainfluenza virus 3 or Moraxella species, highlighting the need to test directly for SARS-CoV-2 as opposed to ruling out an infection using a viral respiratory panel. Samples negative for SARS-CoV-2 by RT-PCR were also negative by metagenomic analysis, and positive for Rhinovirus A and C. Unlike targeted SARS-CoV-2 qRT-PCR testing, metagenomic analysis of these SARS-CoV-2 negative samples identified candidate etiological agents for the patients' respiratory symptoms.

- [One in four hospitalized patients had no risk factors for severe disease](#)

A cohort study of hospitalized patients (n=302) in Georgia reported that non-Hispanic black patients were overrepresented in frequency of hospitalization but had similar probability of mortality during hospitalization compared with nonblack patients. Although a larger proportion of older patients had worse outcomes (23%), a considerable proportion of patients aged 18–64 years who lacked high-risk conditions received ICU-level care and died (5%).

- [Red blood cell distribution width associated with higher mortality](#)

MedRxiv preprint: Elevated red blood cell distribution (RDW) (> 14.5%) was associated with increased mortality in patients of all ages with a risk ratio of 2.5 (95% CI, 2.3-2.8). Patients whose RDW increased during admission had a ~3-fold elevation in mortality risk compared to those whose RDW did not change.

- [Crude association between vitamin D levels and mortality](#)

This cross-sectional analysis found a negative correlation (-0.4435 ; p value=0.050) between levels of mean vitamin D (56.79 nmol/L) and number of cases of COVID-19 per 1 M population in each European country studied (average 1393.4). Researchers concluded that there is a crude association between the mean vitamin D levels with mortality. Vitamin D levels are severely low in the aging population especially in Spain, Italy and Switzerland.

- [75,000 additional “deaths of despair” amidst pandemic](#)

According to short brief by the Well Being Trust, as many as 75,000 more people will die from drug or alcohol misuse and suicide. Despair is exacerbated by three factors: unprecedented economic failure paired with massive unemployment, mandated social isolation for months and possible residual isolation for years.

- [Optimism and exercise to reduce psychological symptoms](#)

MedRxiv preprint: The international study (n=12,817) investigated risk and resilience factors for mental health outcomes found female gender, pre-existing psychiatric condition, and childhood trauma were identified as notable risk factors. Oppositely, optimism, ability to share concerns with family and friends, positive prediction about COVID-19, and daily exercise predicted fewer psychological symptoms.

Contributing team members: Christophe G. Lambert, Shawn Stoicu, Ingrid Hendrix, Anastasiya Nestsiarovich, Praveen Kumar, Nicolas Lauve, Melissa Cossé, Lauren Tagliaferro Epler, Timothy Campbell, Jenny Situ, Aly Raboff, Alexandra Yingling, Perez Olewe, Cristian Bologa, Tudor Oprea, Orrin Myers, Douglas J. Perkins.