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Executive Summary

NM Highlights: State fair cancelled. Phase 2 reopening stalls. Fewer New Mexicans staying home. ABQ July 4 celebration plan. NM case update.

US Highlights: Family members infected following surprise birthday party. New cases spike in Texas due to early reopening of bars.

International Highlights: 50% in Austria ski resort have antibodies.

Economics, Workforce, Supply Chain, PPE: Why people do not wear masks. Mask filtration efficiencies compared. Masks worn incorrectly. Ultraviolet-based biophotonic technologies. Improved mask designs. Mask wearing controversy.

Epidemiology Highlights: Contamination through air flow paths. Contamination of wastewater circulation.

Healthcare Policy Recommendations: Moralizing COVID-19 mitigation practices contributes to social polarization. Misperception of exponential infection growth by Americans is common but can be corrected. Adjust quarantine plans for the findings that older patients might have a longer incubation period. Hazards of school reopening in European countries with high transmission rates.

Practice Guidelines: Several Brazilian recommendations are published on managing lung cancer, performing laparoscopic surgery, and breastfeeding. Guidelines are provided and managing gynecological cancer.

Testing: Test accessibility, frequency and speed of reporting matters more than sensitivity. Prolonged shedding of SARS-CoV-2. Sensitivity of nasopharyngeal and swabs testing. Testing algorithm for essential workers.

Drugs, Vaccines, Therapies, Clinical Trials: dexamethasone trial preprint criticized, smallpox-based COVID-19 vaccine, 27 new clinical trials.

Other Science: Pandemic sees increased alcohol consumption. Charlson Comorbidity Index predicts poor outcomes. CT features associated with severity. Immune-inflammatory tests associated with severity. Hepatic complications.

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NM Highlights

- ### NM State fair 2020 cancelled

  KOAT: In another hit to the state's economy, State Fair officials announced this year's fair would be canceled. The 49th Annual Balloon Fiesta has already been postponed. It's devastating for those who are in the fair industry. Any gate admission ticket's purchased or vendor spots reserved, will be valid for either of the next two state fairs.

- ### Phase II of reopening stalls as new cases rise

  KOAT: New Mexico Gov. Michelle Lujan Grisham believes the state is not ready to enter phase two of the re-opening plan. She is not lifting any restrictions, but she's not adding any either. Face coverings are still required in public. People who fly in from out of state have to quarantine for 14 days. Large events are banned and capacity limits on stores and restaurants are still in place.

- ### Geospatial data company reports fewer New Mexicans are staying home

  KOB: New Mexico ranks 13th best at staying home. About 7% fewer households staying at home each day now compared to April 16, when New Mexico had its peak.

- ### Albuquerque, Bernalillo County release plans for July 4 celebration

  KRQE: The City is partnering with Bernalillo County to put on four fireworks shows, one in each quadrant of the city. There will also be radio broadcasts so people can listen to music while enjoying the show. The displays and nearby parking will be blocked off to the public several hours ahead of the planned launch at 9:20 p.m. APD and the City and county fire departments will be at the four sites to make sure people aren't gathering there.

- ### NM reports 1 more COVID-19 deaths and 192 additional cases on June 28

  As of today (6/28), the total positive cases and total deaths in the state are 11,809 and 492, respectively. The state has performed 331,048 tests, there are 114 individuals currently hospitalized for COVID-19, and 5,264 COVID-19 cases have recovered. NMDOH portal featuring epidemiologic breakdown of cases.

US Highlights

- ### Surprise birthday party infects 18 relatives, some critical

  WFAA News: A surprise birthday party in Carrollton, North Texas attended by 25 extended family members infected 18 of them. Among those infected are two young children, two grandparents, a cancer patient, and an old couple in their 80s. Of those 18 cases, 3 were hospitalized and one is on life support in ICU.

- ### Texas governor says he let bars reopen too early as 5,000 Texans now hospitalized for virus

  KVIA ABC-7 News: Facing a surge of new coronavirus cases, Texas Gov. Greg Abbott expressed regret for allowing bars to reopen so early, saying Friday that he did not realize how fast the virus would spread. In an evening interview with KVIA in El Paso, Abbott (R) said that if he could go back and redo anything, it probably would have been to slow down the opening of bars, now seeing the aftermath of how quickly the coronavirus spreads in the bar setting. For the third day in a row, the United States set a single-day record for new cases, with 44,702 reported Friday. Thirteen states set their own records for the average number of new cases reported over the past seven days.

International Highlights

- ### Almost half in virus-hit Austria ski resort have antibodies: A study

  Medical Press: A study by the Medical University of Innsbruck shows 42.4 percent of those living in Ischgl--an Austrian ski resort--are thought to carry new coronavirus antibodies. Visitors to Ischgl turned out to be the source of many infections in countries around the world. For the study, 79 percent of the population—or 1,259 adults and 214 children from some 480 households—were tested between April 21 and 27.

Economics, Workforce, Supply Chain, PPE Highlights

- ## Why people avoid face mask use: a multidimensional face mask perceptions scale

  British Journal of Health Psychology: Many in Western societies are reluctant to wear face masks, compared to Asian patients (<35% vs. 75% respectively). A survey was administered to 205 people via Mechanical Turk. The top reasons reported for why respondents did not wear facemasks were that they: are irritating and/or hamper breathing (60%), do not prevent illness and/or person is immune to illness (41%), are difficult to make or purchase (36%), are not needed when other safety precautions are taken (16%), are inconvenient to wear (16%), have an undesirable appearance (13%), cause negative social attention (10%). Through a factor analysis they created a scale with the following factors: comfort, efficacy doubts, access, compensation, inconvenience, appearance, attention, and independence.

- ## Comparison of filtration efficiencies of mask materials

  ACS Publications: Filtration efficiency (FE), differential pressure (DeltaP), quality factor (QF) and construction parameters were measured for 32 cloth materials (14 cotton, 1 wool, 9 synthetic, 4 synthetic blends, and 4 synthetic/cotton blends) used in cloth masks intended for protection from the SARS CoV-2 virus (diameter 100 +/- 10 nm). 7 polypropylene-based fiber filter materials were also measured, including surgical masks and N95 respirators. Materials were micro-imaged and tested against size selected NaCl aerosol with particle mobility diameters between 50 nm and 825 nm. Three of the top five best performing samples were woven 100% cotton with high to moderate yarn counts and the other two were woven synthetics of moderate yarn counts. In contrast to recently published studies, samples utilizing mixed materials did not exhibit a significant difference in the measured FE when compared to the product of the individual FE for the components. The FE and DeltaP increased monotonically with the number of cloth layers for a lightweight flannel, suggesting that multi-layered cloth masks may offer increased protection from nanometer-sized aerosol with a maximum FE dictated by breathability (i.e. DeltaP).

- ## Study highlights incorrect mask use among public

  MedRxiv preprint: An observational study of 12,588 people in five Brazilian cities within a metropolitan area. Despite this being a densely populated region and heavily impacted with a high-risk population, only 45.1% of the observed population wore in face masks in a correct way, and another 15.5% simply did not use masks at all. The remainder used masks incorrectly, which is evidence of the worst scenario of people believing that they are protected when they are not. Education on the proper use and importance of face masks is urgently needed.

- ## Ultraviolet-based biophotonic technologies for control and prevention of COVID-19

  Photodynamic Therapy: The strategies are implemented using ultraviolet (UV) light-based innovations to decontaminate N95 and SN95 respirators, robot-controlled UV surface disinfection in hospital rooms, and microbial inactivation on food safety applications. UV germicidal irradiation (UVGI) in cleaning robots can reduce the risk of transmission among employees of medical institutions, food producers and the pharmaceutical industry. UVGI innovation may also benefit cleaners, drivers, and caregivers, who need to be in contact with potentially contaminated surfaces and diseased people. Since many hospitals do not have the UVGI equipment, the initiative for scalable production of UV light-emitting diodes (LEDs) should be encouraged for attending the global demand and decreasing the price per device unit. Innovations should aim for compact equipment and strategies to address the lack of space in hospitals by placing disinfection apparatus in several locations and ensuring proper transportation of reusable respirators. Opportunities include increasing sales volume for UV-related products and technology.

- ## New improved face mask designs

  Journal of Public Health Research: The Chinese author proposed 3 improved masks designs to reduce the contact. Design-A features a mask with a water channel that allows the user to remain hydrated without removing the cover. Design-B has a folding pattern that hides the outer surface. Design-C combines the mask with the brim of a cap which form an extended air-intake area. Through understanding the problem, related product began distributing on the market, Design-D extend the mask usages period with less contact.

- ## Masks could help stop Coronavirus so why are they still controversial?

  Wall Street Journal: Discussion of differences across countries in the cultures surrounding mask wearing, implying that

cultural norms inform the mass behavioral differences that shape countries' success in containing the pandemic.

Epidemiology Highlights

- ### Identification of SARS-CoV-2 RNA in healthcare heating, ventilation, and air conditioning units

  MedRxiv: The presence of SARS-CoV-2 RNA was detected in approximately 25% of samples taken from nine different locations in multiple air handlers. While samples were not evaluated for viral infectivity, the presence of viral RNA in air handlers raises the possibility that viral particles can enter and travel within the air handling system of a hospital, from room return air through high efficiency MERV-15 filters and into supply air ducts. Although no known transmission events were determined to be associated with these specimens, the findings suggest the potential for HVAC systems to facilitate transmission by environmental contamination via shared air volumes with locations remote from areas where infected persons reside.

- ### Analysis of wastewater shows virus was circulating in northern Italy in December 2019

  MedRxiv preprint: Molecular analysis was undertaken with both nested RT-PCR and real-rime RT-PCR assays. A total of 15 positive samples were confirmed by both methods. Of these, 8 were collected before the first autochthonous Italian case. The earliest dates back to 18 December 2019 in Milan and Turin and 29 January 2020 in Bologna. Samples collected in January and February in the three cities were also positive. It was circulating in different geographic regions simultaneously, which changes previous understanding of the geographical circulation of the virus in Italy.

Healthcare Policy Recommendations

- ### Dangers of moralizing COVID-19 mitigation practices and how to avoid doing so

  British Journal of Social Psychology: While moral content can be important for creating drastic, rapid behavior change, in the longer term, moral messages may contribute to social interactional difficulties and polarization. An alternative or complementary strategy is to use non-moral or pragmatic messages, communicating that mitigating practices have become 'our new normal'; that is, they are widely accepted in the community and do not necessarily signal individual moral virtue. Through signals of what represents the default, institutions can influence behavior without officially enforcing it. Spaced floor markings that have appeared in many public spaces signal that distancing is considered important (i.e., an injunctive norm). Although organizations may want to remove these markers, they may help motivated and vulnerable individuals to uphold and protect social distance in public settings and avoid potential social backlash by others for doing so. Ongoing relaxation of government restrictions could unintentionally imply that the worst has passed, and society is on a trajectory back to 'normal'. This may increase perceptions that only a 'minority' are still engaging in social distancing, accentuating social difficulties.

- ### Misperception of exponential virus growth as linear is common but can be corrected

  PNAS: American participants were recruited online via Amazon MTurk during the mass spreading of the virus in the US. Participants guessed the total number of coronavirus cases over the past 5 days. Study 1 shows that comparing participants' estimates against linear and quadratic trends in the actual data of the virus's growth, drawn from the Worldometer COVID-19 database, participants under-estimated both the virus's linear (P<0.0001) and exponential growth (P<0.0001). On average, they underestimated the actual growth of the virus's over that time period by 45.7% (P<0.0001). Compared to liberals, conservatives did not underestimate the problem (defined as number of infections) per se, but underestimated its exponential growth. The experimental instruction about the exponent virus growth   primarily corrected participants' misunderstanding. Participants in the experimental condition were also significantly more supportive of social distancing than participants in the control condition. Next, all participants read the current estimates of coronavirus in US and the current statistic. They guessed the development of the virus's spread over the next 15 days. In the experimental condition, participants were instructed to arrive at their estimate in five steps, first guessing the number of active coronavirus cases in four intermediate steps, each 3 days apart. Because this time frame matched the statistic (provided to all participants) that the number of cases doubles every third day, this helped participants understand the implications of exponential growth. In the control condition, participants instead made an immediate estimate of the number of cases after 2 wk. Importantly, these participants received the same statistical in-formation. Participants in the experimental condition produced 173% higher final estimates of the number of known cases after 2 weeks than controls (P<0.0001).

- [Older patients have longer incubation period: use it for quarantine policy](#)

  MedRxiv preprint: This retrospective analysis was based on publicly reported, clinically confirmed cases with symptoms from two sources. There were 111 exposed individuals with complete information available. Patients older than 42 years of age have, on average, had longer incubation periods, compared to 42-year-old or younger patients (p=0.036), whereas gender has no effect on the incubation period (p=0.417). The median incubation period was 6.3 days overall, being 5.5 days and 7.2 days for younger and older patients, respectively. The mean incubation period is 6.7 days for the younger patients, and 8.7 days for the older patients. Using the uniform 14-day quarantine policy recommended by the WHO and the US CDC the estimators implied that 9.2% of COVID-19 patients younger than 42, and 18.6% of older patients may pose a risk of infection to others before onset of their symptoms in the worst-case scenario. Using a 21-day quarantine, these percentages reduced to 1.7% and 5.6%, respectively. To ensure that at least 90% of cases' symptoms being manifested during quarantine periods, the required durations are estimated to be 14 days for patients 42 years of age or younger and 18 days for patients older than 42 years.

- [European countries with high transmission rate: school reopenings led to higher community infections](#)

  MedRxiv preprint: The effect of school closure and subsequent reopening on the transmission of COVID-19 was explored by considering Denmark, Norway, Sweden, and German states as case studies. By comparing the growth rates in daily hospitalizations or confirmed cases under different interventions, the authors provide evidence that the effect of school closure is visible as a reduction in the growth rate approximately 9 days after implementation. Limited school attendance, such as older students sitting exams or the partial return of younger year groups, does not appear to significantly affect community transmission. A large-scale reopening of schools while controlling or suppressing the epidemic appears feasible in countries such as Denmark or Norway, where community transmission is generally low. However, school reopening can contribute to significant increases in the growth rate in countries like Germany, where community transmission is relatively high.

Practice Guidelines

- [Lung Cancer: recommendations from the Brazilian Thoracic Oncology Group](#)

  CLINICS: Patients should be contacted on the day prior to their visit and questioned whether they, or any of their close contacts, have had any close contact with COVID-19 patients, or developed COVID-19 symptoms in the last 14 days. This questioning should be repeated upon their arrival at the clinic. If the patient has/had COVID-19 symptoms or contact with COVID-19 individuals, their visit should be postponed. If the symptoms are mild, they should be tested for SARS-CoV-2 (PCR - nasal swab), put into domiciliary isolation and followed up by telemedicine for 14 days, before restarting treatment. If symptoms are moderate to severe, the patient should be hospitalized. Limit number of companions to one, and restrict, if possible, access of companions to the clinic. Patients who tested positive must remain isolated for 14 days after the start of symptoms or after the date of the test (if asymptomatic). These and other recommendations are provided.

- [COVID-19 and gynecological cancer: a review of the published guidelines](#)

  International Journal of Gynecological Cancer: This is a detailed review of published guidelines, statements, comments from peer-reviewed journals, and nationally/internationally recognized professional bodies and societies' web pages. Recommendations for surgical and oncological prioritization of gynecological cancers are discussed and summarized. The role of minimally invasive surgery, patient perspectives, medical-legal aspects, and clinical trials are also discussed. The consensus is that elective benign surgery should cease, and cancer surgery, chemotherapy, and radiotherapy should continue based on prioritization. Patient and staff face-to-face interactions should be limited, and health resources used efficiently using prioritization strategies.

- [Brazilian recommendations for laparoscopic surgery during the COVID-19 pandemic](#)

  Rev Col Bras Cir: Recommendations are provided from the Brazilian College of Surgeons.

- [Brazilian guidance on breastfeeding during the Covid-19 pandemic](#)

  Rev Assoc Med Bras: Brazilian authors analyzed 20 recent publications on breastfeeding and Covid-19 and found the evidence that an infected mother can pass the virus through respiratory droplets when in contact with the child, including

during breastfeeding. They suggest the following precautions: Washing hands for at least 20 seconds before touching the baby or extracting breastmilk (manual extraction or by pump). Wearing a face mask and avoiding talking or coughing during breastfeeding. Immediately changing masks in case of coughing or sneezing, or at every feeding. Strictly follow the recommendations for cleaning the pumps for milk extraction after each use according to the manufacturer's specifications. Consider the possibility of asking for help from someone who is healthy to feed the newborn with the breastmilk using a cup or spoon.

Testing

- ### [Test accessibility, frequency and reporting speed matters more than sensitivity for stopping outbreaks](#)

  MedRxiv: Tests that rely on the technique quantitative polymerase chain reaction (qPCR) can detect the merest traces of SARS-CoV-2 genetic material but are expensive and slow to return results. To gauge the importance of test sensitivity, researchers at the Harvard School of Public Health modeled the effect of widespread testing on viral spread in a large group of people. The researchers found that weekly surveillance testing, paired with case isolation, would limit an outbreak even if the testing method was less sensitive than qPCR. By contrast, surveillance testing done every 14 days would allow the total number of infections to climb almost as high as if there were no testing at all. The findings have not yet been peer reviewed.

- ### [Prolonged shedding of SARS-CoV-2 RNA among patients with COVID-19](#)

  Cambridge University Press: 6,040 SARS-CoV-2 PCR tests were performed among 70,406 unique patients at multiple sites. 15% patients tested positive for SARS-CoV-2. 5% of patients with an initial positive test for SARS-CoV-2 RNA underwent at least one subsequent SARS-CoV-2 PCR test within 25 days of the first test. Among patients with a subsequent test 1-5 days after their initial positive test, 88% continued to have a positive test. Among patients with a subsequent test 21-25 days after their initial positive test, 56% continued to have a positive test. The study shows a prolonged duration of SARS-CoV-2 RNA shedding among patients with COVID-19 contributing to the discussion on infection prevention.

- ### [Sensitivity of nasopharyngeal swabs and saliva for the detection of SARS-CoV-2](#)

  Oxford Academic: 91 consecutive in-patients with COVID-19 at six hospitals in Toronto, Canada were enrolled, and tested one nasopharyngeal swab/saliva sample pair from each patient using RT-PCR for SARS-CoV-2. Sensitivity was 89% for nasopharyngeal swabs and 72% for saliva (p=0.02); difference in sensitivity was greatest for sample pairs collected later in illness. More data may be needed to assess testing on different platforms and to assess the sensitivity of different specimen types in asymptomatic patients.

- ### [A proposed COVID-19 testing algorithm for essential workers](#)

  Cambridge University Press: All persons who are able to continue physical distancing would continue to do so. The algorithm then begins by providing serology testing every 2 weeks on the EW who return to work. This timeframe was chosen as it is the approximate incubation period of the Coronavirus. Those who are shown to have previous infection and immunity will then no longer need further testing. Those who are not immune will continue to work with appropriate PPE and be re-tested every 2 weeks. Should a worker have a concerning coronavirus exposure or develop symptoms, they would get nasopharyngeal testing for active COVID-19 infection. Those with negative testing will re-enter into the normal serologic testing pathway. The worker who becomes positive for COVID-19 infection via nasopharyngeal swab will be isolated for 14-21 days until their infection has passed. At the end of this time, they will again undergo serologic testing. If they are then proven to be immune, they will be certified for full activity and will exit the algorithm. If they do not show signs of immunity on serologic testing, they will re-enter the previous series of testing every 2 weeks. Once testing is available, the same algorithm could be used for the general public.

Drugs, Vaccines, Therapies, Clinical Trials

- ### [Demand for dexamethasone surges as RECOVERY trial releases preprint to some criticism](#)

  The BMJ reporting on medRxiv preprint: Production of dexamethasone must be rapidly ramped up to meet global demand for the drug, the WHO has said. The call came as the University of Oxford's RECOVERY trial published its much-anticipated preprint paper on the drug's effect on covid-19. The [paper preprint](#) states that the drug cuts deaths in ventilated patients by

one third and deaths in other admitted patients receiving oxygen by only one fifth. John Fletcher, research editor at The *BMJ* who screened the preprint for *MedRxiv*, said that the trial was useful but that there were "limitations and cause for caution". He said, "the authors have used relative reductions and chosen the subgroup with the biggest benefit to generate a headline of a one third reduction in deaths. The subgroup analysis was not specified in the trial registry and may be misleading." Fletcher also noted that the final outcome was unknown for at least 28% of people entered in the trial, as 1807 were still in hospital at 28 days, the endpoint of the trial.

- ## Modified smallpox based SARS-CoV-2 vaccine induces strong neutralizing antibody response

  bioRxiv preprint: A vaccine candidate using the smallpox vaccine virus (vaccinia ankara) shows good immune response in mice when the full spike protein is included. The results comparing two versions of MVA vaccines expressing either the full length prefusion stabilized spike or secreted S1 demonstrated that while both immunogens induce strong binding antibody response to spike only the former induces a strong neutralizing antibody response against the SARS-CoV-2.

- ## 27 new COVID-19 Trials registered June 26-28 at clinicaltrials.gov

  Treatment trials: M5049, Favipiravir, DUR-928, Interferon-B-1z, Ivermectin, Losartan, mavrilimumab, Chloroquine, zinc. At time of writing, a total of 2152 were active, 181 completed, and 4 posted results.

Other Science

- ## Pandemic associated with increased alcohol consumption

  MedRxiv preprint: A longitudinal study of U.S. and U.K. populations demonstrated a significant increase in problem drinking. Among US adults, there was a statistically significant increase in the percentage of participants reporting drinking alcohol ≥ 4 times a week which rose significantly from 11.7% to 17.9% (53% increase, p < .001) as the crisis developed. Among UK adults, the percentage of participants reporting drinking ≥ 4 times a week increased significantly from 14.2% to 23% (62% increase, p < .001) and heavy episodic drinking at least weekly increased significantly from 9.7% to 16.6% (71% increase, p < .001) when compared to pre-lockdown levels. Trends were similar across population demographics, although those aged under 50 years and higher income groups displayed the largest increases.

- ## Higher Charlson Comorbidity Index Scores associated with more severe outcomes and death

  Journal of General Internal Medicine: 4480 patients with COVID-19 were analyzed in the study, using information from the Danish Registration Systems. Data on comorbidities 10 years prior to the date of COVID-19 were identified to calculate the exposure of interest: CCIS of 0, 1–2, 3–4, and > 4. Overall, 65.0%, 24.8%, 6.4%, and 3.8% of included patients had a CCIS of 0, 1–2, 3–4, and > 4, respectively. 17.8% had severe outcome and 9.3% died. In the CCIS 0 group 9.1%) had severe outcome and 2.6% died. In the CCIS 1–2, 3–4, and > 4 groups, 29.7%, 42.7%, and 47.3% had severe outcome and 17.7%, 29.5% and 34.3% died, respectively. The odds of severe COVID-19 were significantly increased in CCIS 1–2 ([OR], 1.76 [95% CI, 1.43 to 2.16]),CCIS 3-4 (OR, 2.36 [95% CI, 1.74 to 3.18]) and CCIS > 4(OR, 2.67 [95% CI, 1.87 to 3.81]) compared with those in CCIS 0. The odds of death were significantly increased for CCIS 1–2 (OR, 2.13 [95% CI, 1.57 to 2.90]), CCIS 3– (OR,3.00 [95%CI, 2.06to4.38]), and CCIS>4 (OR,3.85[95%CI, 2.51 to 5.90]) compared with those for CCIS 0.The estimated absolute risks of severe COVID-19 and death were increased for CCIS 1–2, 3–4, and >4 compared with those for CCIS 0 across ages and sexes.

- ## Meta-analysis of chest CT features of patients with COVID-19 pneumonia

  Journal of Medical Virology: 15 articles describing 1453 common (non-severe) patients and 697 severe patients met the inclusion criteria. Based on the CT images, the common patients less frequently exhibited consolidation (OR=0.31), pleural effusion (OR=0.19), lymphadenopathy (OR=0.17), crazy-paving pattern (OR=0.22), interlobular septal thickening (OR=0.27), reticulation (OR=0.20), traction bronchiectasis (OR=0.40) with over 2 lobes involved (OR=0.07) and central distribution (OR=0.18) while more frequently had unilateral pneumonia (OR=4.65) involving 1 lobe (OR =13.84) or 2 lobes (OR=6.95) when compared with severe patients. Other CT features including GGOs (P=0.404), air bronchogram (P=0.070), nodule (P=0.093), bronchial wall thickening (P=0.15), subpleural band (P=0.983), vascular enlargement (P=0.207) and peripheral distribution (P=0.668) did not have significant association with the severity of the disease. No publication bias among the selected studies was suggested (Harbord's tests, P>0.05 for all.)

- ## Immune-Inflammatory parameters associated with severity: systematic review and meta-analysis

Frontiers in Medicine: A total of 4,911 patients from 29 studies were included in the meta-analysis. The results demonstrated that severe patients tend to present with increased white blood cell (WBC) and neutrophil counts, neutrophil-lymphocyte ratio (NLR), procalcitonin (PCT), C-reaction protein (CRP), erythrocyte sedimentation rate (ESR), and Interleukin-6 (IL-6) and a decreased number of total lymphocyte and lymphocyte subtypes, such as CD4+ T lymphocyte and CD8+ T lymphocyte, compared to the non-severe patients. In addition, the WBC count>10 x 10(9)/L, lymphocyte count<1 x 10(9)/L, PCT>0.5 ng/mL, and CRP>10 mg/L were risk factors for disease progression in patients with COVID-19 (WBC count>10 x 10(9)/L: OR = 2.92, 95% CI: 1.96-4.35; lymphocyte count<1 x 10(9)/L: OR = 4.97, 95% CI: 3.53-6.99; PCT>0.5 ng/mL: OR = 6.33, 95% CI: 3.97-10.10; CRP>10 mg/L: OR = 3.51, 95% CI: 2.38-5.16). NLR, as a novel marker of systemic inflammatory response, can also help predict clinical severity in patients with COVID-19 (OR = 2.50, 95% CI: 2.04-3.06).

- [Hepatic manifestations and complications of COVID-19: a meta-analysis](#)

  Journal of Infection: Synthesis of the current literature suggests that liver enzyme abnormalities, acute hepatic injury and hypoproteinemia are frequent hepatic complications among patients hospitalized with COVID-19. Intensive monitoring of markers of these complications and management during admission could help in the prediction of favorable outcomes.

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