COVID-19 Research Watch
August 14, 2020

PEDIATRIC PRESENTATION
Racial/Ethnic and Socioeconomic Disparities of SARS-CoV-2 Infection Among Children
This cross-sectional study assessed the racial/ethnic and socioeconomic differences in SARS-CoV-2 infection rates among children. 1000 children (aged 0-22 years old, median age 8) with mild symptoms were tested at a community-based testing site between March 21 – April 28, 2020. Overall, 20.7% of children tested positive for SARS-CoV-2 (median age 11). Compared to non-Hispanic (NH) white children (7.3%), NH-black (30.0%, OR 3.3) and Hispanic (46.6%, OR 9.1) had higher rates of infection. Infection rates also differed by median family income (MFI); compared to those in the highest MFI quartile (8.7%), infections rates were higher among children in quartile 3 (23.7%, OR 3.2), quartile 2 (27.1%, OR 3.8), and quartile 1 (37.7%, OR 5.9). Race/ethnicity was similarly associated with exposure to SARS-CoV-2 as well. Authors emphasize the need to understand and address the causes of these disparities in order to limit the spread of infection.

An increasing public health burden arising from children infected with SARS-CoV2: a systematic review and meta-analysis
This systematic review included the results of 14 studies (1 from Spain and 13 from China), with data on COVID-19 in a total of 410 children. The analysis found that across all of the studies, 40% of the COVID-19 cases in children were asymptomatic and 84% of child cases also had a family member with a confirm diagnosis, indicating a family cluster infection. Ten percent (10%) of children with COVID-19 were found to have coinfections; the most common pathogens detected among coinfections were influenza or parainfluenza viruses and Mycoplasma pneumonia.

Multisystem inflammatory syndrome in children (MIS-C) is a rare condition that occurs two to four weeks after children and adolescents experience acute COVID-19. Of 565 patients with MIS-C who were tested for COVID-19, 99.1% received a positive RT-PCR or serology test result. Effects of MIS-C include gastrointestinal symptoms, inflammation, heart complications, and shock. In order to deliver appropriate and timely care, it is crucial to identify and diagnose MIS-C from COVID-19 and other inflammatory diseases.

CLINICAL PRESENTATION AND MANAGEMENT
Pathophysiological Basis and Rationale for Early Outpatient Treatment of SARS-CoV-2 (COVID-19) Infection
In the absence of definitive randomized controlled trials, McCullough et al. outlines key pathophysiological principles that relate to treatment of patients with early infection at home to reduce hospitalization and deaths rates. The authors discuss the importance of controlling contagion at home and reducing self-reinoculation by means of properly ventilating the home. They suggest combining several nonspecific antiviral agents to reduce viral replication in early infection, including zinc lozenges and zinc sulfate, antimalarials (hydroxychloroquine), azithromycin, doxycycline, and favipiravir. Immunomodulators, such as colchicine, are suggested to address excess inflammation and cytokine activation in acutely ill COVID-19 patients. Antiplatelet agents and antithrombotics may be administered to prevent pulmonary thrombosis, which is thought to be the cause of chest heaviness described by COVID-19 patients. Finally, the authors suggest maintenance of arterial
oxygen saturation on room air or prescribed home oxygen under direct supervision through telemedicine as an oxygen delivery and monitoring approach.

PATHOPHYSIOLOGY

Association between markers of immune response at hospital admission and COVID-19 disease severity and mortality: A meta-analysis and meta-regression

To identify the relationship between laboratory values in hospitalized COVID-19 patients upon admission and disease severity and mortality, a systematic review and meta-analysis was conducted utilizing four databases between December 2019 and May 2020. Weighted mean differences and confidence intervals for 27 laboratory markers associated with disease severity were calculated in each of the 64 studies included in the analysis. Most markers showed statistically significant association with both disease severity and mortality. Specifically, the results showed that hyperinflammation, blunted adaptive immune response, and intravascular coagulation play important roles in COVID-19 pathogenesis. There were no significant associations between sex or age of adult for any of the included markers. Thus, the authors suggest that patients with markers related to the previously listed processes are suitable for early intervention.

Ocular Findings in Patients with Coronavirus Disease 2019 (COVID-19) in an Outbreak Hospital

This cross-sectional study conducted in Diyarbakir, Turkey, between May 1 and June 30, 2020 included 359 patients with confirmed COVID-19 admitted to a pandemic hospital. Ocular diseases were observed in 4.5% of patients, including conjunctival hyperemia, conjunctivitis, subconjunctival hemorrhage, and vitreous hemorrhage. Rate of ocular disease differed between inpatients (4.1%) and ICU patients (6.2%). Patients with conjunctivitis had higher neutrophil/lymphocyte ratios and C-reactive protein counts than those without conjunctivitis, however the difference was not statistically significant. Authors suggest that conjunctivitis may be an initial symptom of COVID-19, even though this is rare.

Clinical course and molecular viral shedding among asymptomatic and symptomatic patients with SARS-CoV-2 infection in a community treatment center in the Republic of Korea

In South Korea, a retrospective cohort study evaluated the molecular viral shedding of 303 symptomatic and asymptomatic patients infected with SARS-CoV-2. During isolation, 36% of patients were asymptomatic, and of these patients, 19% developed symptoms of COVID-19. The median time for virus detection from symptom onset in presymptomatic patients was 15 days. The median time from diagnosis to negative conversion was 17 days for asymptomatic and 19.5 days for symptomatic patients. The results of this study showed a similarity in viral loads between symptomatic and asymptomatic patients indicating a possible need for the isolation of asymptomatic patients to prevent community spread of SARS-CoV-2.

NON-CLINICAL TRENDS

Time and Covid-19 stress in the lockdown situation: Time free, «Dying» of boredom and sadness

In this study, 928 French men and 3,436 French women participated in an online questionnaire asking about perceived stress during the COVID-19 lockdown in France. Surveys asked questions related to stress and anxiety, emotions experienced during and before the lockdown, and the experience of the passage of time. These factors were measured using a visual analog scale (VAS) ranging from 0-100. The study found that
across the French population, stress related to COVID-19 was higher than stress at work and at home, which is consistent with studies conducted in China and Iran. Though this was the case, stress did not seem to have a profound impact on the population’s experience of time. The study found that emotional experiences during the lockdown, however, slowed down participant's sense of time. This was attributed to increases in boredom and sadness during the lockdown and not levels of stress or anxiety.

TRANSMISSION PATTERNS
Low-cost measurement of facemask efficacy for filtering expelled droplets during speech
This study tested 14 widely available masks, a professional fit-tested N95 mask, and a patch of mask material to understand transmitted droplet count through each mask. Using an optical measurement method, consisting of a laser, camera, and lens, upon speech into an enclosure, light scattering from particles was detected to determine droplet count. Each mask underwent 10 trials, each trial consisting of five repetitions of the same phrase. Those with significant droplet detection underwent further trials. The study ultimately found high droplet counts, thus little protection, through use of fleece or bandanas, as well as knitted masks. Fitted N95 masks, surgical masks, and masks with polypropylene experienced significantly lower transmitted droplet counts.

MODELS
Potential effects of disruption to HIV programmes in sub-Saharan Africa caused by COVID-19: results from multiple mathematical models
This study used five different mathematical models to estimate the effect of the COVID-19 pandemic on excess mortality related to HIV as well as new HIV infections across sub-Saharan Africa (SSA). The primary analysis estimated the effect of 50% of the population having interrupted HIV care for a 6-month period, including the lack of access to anti-retroviral therapy (ART), HIV prevention services, and HIV testing. The models suggest that a 6-month interruption of ART would lead to 1.63 times the number of HIV-related deaths within a year, compared to if there was no interruption. This increase translates to an additional 296,000 HIV-related deaths across SSA over a 1-year period. The models estimate that new HIV infections may increase up to 1.19 times during this same period due to disruptions in outreach and condom programs; however, if physical distancing leads to reduced sex with non-regular partners, it is possible there might be a net reduction in new infections.

NON-PHARMACEUTICAL/PUBLIC HEALTH INTERVENTIONS
Masks Do More Than Protect Others During COVID-19: Reducing the Inoculum of SARS-CoV-2 to Protect the Wearer
The benefit of masking to protect others has been widely described. In this article, Gandhi et al compiled virologic and epidemiologic evidence to assess the link between mask wearing, the viral inoculum, and rates of asymptomatic SARS-CoV-2 infection. The authors note that rates of asymptomatic and mild infections have increased in settings where population-level masking has occurred; for example, a systematic review of studies before mask wearing was commonly practiced estimated the proportion of asymptomatic infection to be 15% while a later narrative review placed the proportion at 40-45%. The authors also identified examples of specific settings (a cruise ship, a hemodialysis unit, a seafood processing plant, and a chicken plant) in which individuals were exposed to the virus and masking was used; in these examples the outcomes were high rates of asymptomatic infection. The authors posit that universal masking
reduces the dose of the virus for the person wearing the mask, leading to less-severe illness and potentially to increases in community-level immunity.

PHARMACEUTICAL INTERVENTIONS

AVIFAVIR for Treatment of Patients with Moderate COVID-19: Interim Results of a Phase II/III Multicenter Randomized Clinical Trial

Favipiravir (an RNA-dependent RNA polymerase inhibitor) has been resynthesized in Russia under the brand name AVIFAVIR. In a multicenter and open label Phase II/III clinical trial, 60 patients hospitalized with moderate COVID-19 were randomized into three groups: an AVIFAVIR 1600/600 mg group, AVIFAVIR 1800/800 mg group, or the standard of care group. On day five, 62.5% of patients on AVIFAVIR and 30% of patients on the standard of care had achieved viral clearance; by day ten, 92.5% of patients on AVIFAVIR and 80% of patients on the standard of care had achieved viral clearance. Based on the interim results of this clinical trial, the authors suggest that AVIFAVIR has high treatment potential and is safe and well-tolerated. Additionally, they note that for people with signs of respiratory distress and cytokine storm, AVIFAVIR use should only be considered in combination with anti-inflammatory agents that are effective against COVID-19. The clinical effects of AVIFAVIR will be further assessed in the next stage of the study.

ADDITIONAL RESOURCES

UCSF Library COVID-19 Research and Information Resources
UCSF Institute for Global Health Sciences COVID-19 Resources
UC Davis One Health Institute COVID-19 FAQs
Harvard Viswanath Lab Myths vs Facts

Note on this Document: This document was assembled by graduate and doctoral students attending the University of California, San Francisco with the intent of facilitating the rapid dissemination of information to the global community in order to help during this time. Sigal Maya, Shivali Joshi, Canice Christian, Alyssa Bercasio, and Sarah Gallalee contributed to these summaries. This work is volunteer based.
References:


