CLINICAL PRESENTATION AND MANAGEMENT

**Alveolar SARS-CoV-2 viral load is tightly correlated with severity in COVID-19 ARDS**
In this study, bronchoalveolar lavage (BAL) fluid was collected from 14 patients with COVID-19 acute respiratory distress syndrome (ARDS). A median of 20,449 SARS-CoV-2 genome copies per microliter of epithelial lining fluid was identified in the BAL fluid of thirteen patients. Alveolar viral load was strongly correlated to the development of ARDS, indicating that severe COVID-19 ARDS may be explained by the viral load in an infected person’s lungs, as well as, the strong inflammatory response.

**Epidemiological, virological and serological features of COVID-19 cases in people living with HIV in Wuhan City: A population-based cohort study**
The authors of this study evaluated the probability of people living with HIV (PLWH) in Wuhan City being infected with SARS-CoV-2 virus, as well as the severity of their COVID-19 symptoms. Among the 6001 PLWH included in this analysis, 35 were infected with COVID-19 by April 16th, 2020 (cumulative incidence=0.58%), and the standardized rates of case-severity and case-fatality, respectively, were similar to that of the general population (43% with severe disease and 5.71% who died). Risk factors for COVID-19 among PLWH included antiretroviral therapy cessation and age over 50 years, indicating the importance of ensuring supply and access to antiretroviral therapy for PLWH during this pandemic.

PEDiatric PRESENTATION

**Hospitalization Rates and Characteristics of Children Aged <18 Years Hospitalized with Laboratory-Confirmed COVID-19 — COVID-NET, 14 States, March 1—July 25, 2020**
This study utilized the hospitalization data from 14 U.S. states to study children hospitalized with COVID-19. The authors found that while children <18 tend to be hospitalized with COVID-19 less than adults (8 vs 164.5 per 100,000 population), the rate of hospitalization among children has been increasing. A third of all hospitalized children with COVID-19 were admitted to the ICU and the most prevalent comorbidities among children hospitalized were obesity (38%), chronic lung disease (18%) and premature birth (15%). Black and Hispanic children were more frequently hospitalized due to COVID-19 compared to white children and the authors suggest further research is needed on social determinants of health to better inform and reduce disparities.

TRANSMISSION PATTERNS

**Transmission onset distribution of COVID-19**
Using Bayesian methods, the authors estimated SAR-CoV-2 transmission onset time distribution by combining transmission onset data, symptom onset, and contact history from 72 infector-infectee pairs in South Korea. The median transmission onset was 1.31 days after symptoms began, peaking 0.72 days before symptoms began with the median incubation period estimated at 2.87 days. Transmission by pre-symptomatic individuals constituted 37% of transmission occurring in these pairs, suggesting that isolating at the time of symptom onset may be insufficient in preventing transmission of SARS-CoV-2.

NON-CLINICAL TRENDS

Using reported county level data, the authors identified disparities in 76 COVID-19 hotspot counties, defined at a 5% or greater difference between the proportion of cases to the proportion of the population, or a ratio of 1.5 or higher of the proportion of cases compared to the proportion of the population of that racial/ethnic group. The authors saw disparities in one or more racial/ethnic groups in 96.2% of the counties. More specifically, Hispanic residents were disproportionately affected by COVID-19 in 74.7% of the counties, Black residents in 27.8%, Native Hawaiian/Pacific Islander in 24.1%, Asian in 5.1%, and American Indian/Alaskan Native in 3.8%. These findings are consistent with previous studies assessing the disproportionate incidence of cases in underrepresented racial/ethnic groups. The authors emphasize the need to better address the pandemic and its effects on underrepresented racial/ethnic groups through strategies focused on these disproportionately affected groups. County level data can better inform resource allocation, and the development of culturally and socially appropriate interventions relating to prevention and testing.

Assessment of COVID-19 Hospitalizations by Race/Ethnicity in 12 States

Cumulative COVID-19 hospitalizations were examined across racial and ethnic groups (White, Black, American Indian and/or Alaskan Native, Asian, and Hispanic) in 12 U.S. states. In all 12 states, the percentage of hospitalization among Black patients was higher than the percentage of their representative proportion of the state population. Conversely, in all 12 states, the share of hospitalizations among White patients was lower than their share in the population. In 10 states, the percentage of hospitalizations for Hispanic patients was higher compared with their state's population representation. In 6 states, the proportion of hospitalizations for Asian patients was lower compared with their state’s population representation. The findings support consistent evidence of considerable disparities in the prevalence of COVID-19 and its risk factors across racial and ethnic subgroups.

Mental Health, Substance Use, and Suicidal Ideation During the COVID-19 Pandemic – United States, June 24–30, 2020

In this study, researchers conducted representative panel surveys among adults ≥ 18 years of age across the United States from June 24-30, 2020. A total of 5,412 (54.7%) of the eligible invited adults participated; methods of quota sampling and survey weighting by gender, age, and race/ethnicity were used to improve participant representativeness. Overall, 40.9% of respondents reported an adverse mental or behavioral health condition. Initiation of or increased substance use to cope with stress or emotions related to COVID-19 was reported by 13.3% of participants and 10.7% reported having seriously considered suicide in the past 30 days. Of that 10.7%, a disproportionate number of young adults ages 18-24 (25.5%), Hispanic persons (18.6%), black persons (15.1%), unpaid adult caregivers (30.7%), and essential workers (21.7%) having seriously considered suicide. Community-level intervention and prevention efforts that aim to strengthen economic support, address stress from racial discrimination, promote social connectedness, and support persons at risk for suicide should be implemented.

PHARMACEUTICAL INTERVENTIONS

Convalescent Plasma Therapy on Patients with Severe or Life-Threatening COVID-19: A Metadata Analysis
The researchers investigated whether convalescent plasma (CP) is a successful treatment in the continuum of care of COVID-19 patients with severe disease by performing a metadata analysis. Though the methods of the metadata analysis are not elucidated in the letter to the editor, the authors find that the literature indicated that CP decreased viral loads (RR 0.13) as well as C-reactive protein levels (ROM 0.11) and improved the clinical status of COVID-19 patients when compared to baseline (ROM 0.53). Future CP therapy decision making could be guided by biomarkers such as C-reactive protein, interleukin 6, d-dimers, and lactate dehydrogenase, as well as risk factors such as age and comorbidities. The authors call for additional studies with larger study populations to further understand the potential for CP to improve survival rates, prevent clinical deterioration, and be administered earlier in the course of the disease. One author of a study included in the metadata analysis responded with a brief comment which can be found here.

**Tocilizumab among patients with COVID-19 in the intensive care unit: a multicentre observational study**

In this retrospective cohort study investigators sought to characterize the association between tocilizumab, a recombinant monoclonal antibody used as therapy to mitigate the cytokine storm syndrome associated with COVID-19, and hospital related mortality among patients (aged ≥ 18 years) requiring ICU care for severe SARS-CoV-2 infection. A total of 764 COVID-19 patients from 13 hospitals in the Hackensack Meridian Health Network (NJ, USA) were treated in the ICU, of whom 210 (27%) received tocilizumab. Using a multivariable Cox regression model with propensity score matching to reduce confounding, the authors found that tocilizumab use was associated with reduced hospital-related mortality (hazard ratio of 0.64, 95% CI 0.47-0.87). In a subgroup analysis, the authors additionally found that tocilizumab exposure was associated with decreased hospital-related mortality among those patients with C-reactive protein concentrations of 15 mg/dL or higher, a marker of an overt inflammatory state.

**PATHOPHYSIOLOGY**

**Selective and cross-reactive SARS-CoV-2 T cell epitopes in unexposed humans**

Peripheral blood mononuclear cells collected from participants between 2015 - 2018 were stimulated in vitro to identify the capacity of the T cell response in people unexposed to SARS-CoV-2. A total of 142 peptides from SARS-CoV-2 were identified, 66 from the spike protein, which elicited an immune response. Epitopes from the spike antigen most often yielded responses and yielded the most vigorous responses. The ability for T cells in unexposed people to respond to SARS-CoV-2 is likely due to cross-reactivity from memory CD4+ T cells that recognize common cold human coronaviruses (HCoVs). Epitopes from SARS-CoV-2 that demonstrated over 67% homology to corresponding HCoV epitopes were more likely to yield an immune response. These findings contrast with previous studies suggesting HCoV neutralizing antibodies do not demonstrate cross-reactivity to SARS-CoV-2. Cross-reactivity of memory CD4+ T cells has implications for vaccine performance and demonstrates the potential for HCoVs exposure to affect COVID-19 disease severity.

**Highly sensitive quantification of plasma SARS-CoV-2 RNA sheds light on its potential clinical value**

Plasma SARS-CoV-2 viral load (SARS-CoV-2 RNAemia) was quantified by droplet-based digital PCR technology and compared in 58 COVID-19 patients and 12 healthy controls. 17 patients were categorized as mild-to-moderate, 16 were categorized as severe, and 26 were categorized as critical. SARS-CoV-2 RNAemia was detected in 43 (74.1%) of patients. Both
the prevalence and levels of positive SARS-CoV-2 RNAemia was correlated with disease severity (ranging from 53% in mild-to-moderate to 88% in critical patients). Droplet-based digital PCR technology used to detect SARS-CoV-2 RNAemia represents a promising prognostic tool for COVID-19.

**Effects of a major deletion in the SARS-CoV-2 genome on the severity of infection and the inflammatory response: an observational cohort study**

In this prospective observational cohort study conducted in Singapore, SARS-CoV-2 patients with a 382-nucleotide deletion (∆382) in open reading frame 8 (ORF8) were identified and compared with wild-type SARS-CoV-2 patients in order to understand the relationship of the infection groups to severity of COVID-19. Using development of hypoxia requiring supplemental oxygen as an indicator of illness severity, 0% of ∆382 variant patients developed severe hypoxia, whereas, in the wild-type group, 28% developed severe hypoxia. Patients with ∆382 variance had lower odds of developing severe hypoxia. Therefore, ∆382 variance appears to be associated with less severe COVID-19 illness, which may inform recommendations for treatment and vaccine development.

**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. James Feng, Sunya Akhter, and Caihla Petiprin contributed to these summaries. This work is volunteer based.

**References:**

2. Jiao Huang, Nianhua Xie, Xuejiiao Hu, Han Yan, Jie Ding, Pulin Liu, Hongfei Ma, Lianguo Ruan, Gang Li, Na He, Sheng Wei, Xia Wang, Epidemiological, virological and serological features of COVID-19 cases in people living with HIV in Wuhan City: A population-based cohort study, Clinical Infectious Diseases, https://doi.org/10.1093/cid/ciaa1186