CLINICAL PRESENTATION AND MANAGEMENT

Sequelae in adults at 6 months after COVID-19 infection

This longitudinal prospective cohort study analyzed the experiences of 177 patients (> 18 years) with SARS-CoV-2 infection using data from questionnaires completed a median of 169 days after the onset of COVID-19 illness. The mean age was 48 years, and 57% of patients were women. Of the 177 participants, 6% had no symptoms, 85% had mild symptoms and 9% were hospitalized for COVID-19. Persistent symptoms were reported by 17 of 64 patients (26.6%) aged 18 to 39 years, 25 of 83 patients (30.1%) aged 40 to 64 years, and 13 of 30 patients (43.3%) aged 65 years and older. Overall, 49 of 150 outpatients (32.7%), 5 of 16 hospitalized patients (31.3%), and 1 of 21 healthy participants (4.8%) in the control group reported at least 1 persistent symptom. Common persistent symptoms included fatigue, loss of taste or smell, and inability to focus (brain fog). The findings of this study illustrate the impact of COVID-19 on health beyond initial infection and illness.

UNIVERSAL SCREENING AND TESTING

SARS-CoV-2 positivity on or after 9 days among quarantined student contacts of confirmed cases

This study assessed the positivity rates for SARS-CoV-2 infection among students who came into close contact with confirmed cases of COVID-19 in Alachua County, Florida. Quarantine protocols for asymptomatic contacts included returning to school the day after a negative result from a test administered on day 9 of quarantine or a 14-day quarantine if no test was administered. The test positivity rate for tests administered on days 9 to 14 of quarantine was 5%. Of the 495 students who were identified as suspected cases, 52% tested positive. Over 2000 contacts were identified, and, of the 134 contacts who received a test on the 3rd day of quarantine, 10% tested positive. For the 839 students who were tested on days 9 to 14, 4.8% tested positive. Following the 9-day testing and quarantine protocol, students lost fewer days of instruction (8097) compared to students following the 14-day quarantine and no testing protocol (11746 days). The results of this study provide insight into quarantine and testing protocols for school exposures to COVID-19.

A robust pooled testing approach to expand COVID-19 screening capacity

This study aimed to determine the best pool size for COVID-19 screening in various risk groups with differing prevalence using data from February 28 to June 14, 2020 in Iceland. Results showed that for prevalence scenarios over 0.292, pooling is not more efficient than individual testing due to the number of follow-up tests needed. Pool testing strategies can decrease the number of tests by 61.9% and 54.2% for high-risk groups and 90.2% and
88.5% for low-risk groups depending on test sensitivity (0.71 and 0.98, respectively). For each pooling strategy, as testing sensitivity increases, the number of low-risk individuals screened decreases. The authors suggest that pooled testing will allow more individuals to be screened for COVID-19 while highlighting the importance of determining pool sizes based on risk groups and prevalence in the community.

**TRANSMISSION PATTERNS**

**Association of the Timing of School Closings and Behavioral Changes With the Evolution of the Coronavirus Disease 2019 Pandemic in the US**

Zimmerman et al. conducted a time-series analysis to study the impact of school closures in the spring of 2020 along with other policy actions (non-essential business closures, bans on large public gatherings, stay-at-home orders, and restaurant closures) and proxies for behavioral change (work reduction, increase in time at home, searches for hand sanitizer, and reductions in restaurant meals) on COVID-19 transmission. The authors found that significant behavior change occurred prior to school closures. When only controlling for state-level covariates, each day of earlier school closure was associated with a 14.6% reduction in COVID-19 incidence. However, when also including days since gathering ban (policy action) and reduction in time spent at work (behavioral change), each day of earlier school closure was associated with a 3.5% reduction in incidence. Meanwhile, each day of earlier behavioral change was associated with a 9.3% reduction. The simulations also suggest that a two-week delay in school closures would have resulted in an additional 587,000 cases, whereas a two-week delay in behavioral change would have resulted in an additional 4.3 million cases. Collectively, these findings indicate that while school closures did prevent COVID-19 cases and deaths, they were not as effective of a public health measure to control transmission as voluntary behavioral changes.

**DETECT Schools Study Protocol: A Prospective Observational Cohort Surveillance Study Investigating the Impact of COVID-19 in Western Australian Schools**

The DETECT Schools Study, initiated in April 2020, aims to understand SARS-CoV-2 transmission in schools in Western Australia, as well as the psychosocial impact of COVID-19 on school communities. This prospective cohort study, currently underway, combines three modules, the first of which is designed to understand asymptomatic COVID-19 prevalence. Module 1 includes three to six months of random throat and nose swabbing of students and staff across 40 of the 79 participating schools. Module 2, yet to be initiated, aims to identify the role schools play in virus transmission and consists of identifying and monitoring close contacts of COVID-19 cases through swabbing, symptom checking, and serology testing. Finally in Module 3, students, staff, and parents will respond to surveys about physical, social, and emotional wellbeing factors associated with the COVID-19 pandemic. Through this multiple module approach, the study creates a protocol for testing and tracking COVID-19 spread across communities with the involvement of multi-level stakeholders.
PHARMACEUTICAL INTERVENTIONS

Early High-Titer Plasma Therapy to Prevent Severe Covid-19 in Older Adults

Previous studies analyzing the use of convalescent plasma for patients hospitalized with COVID-19 and late in the course of illness found no clear benefit. In this study, Libster et al. conducted a randomized, double-blind, placebo-controlled trial in Argentina to study the effectiveness of high-titer convalescent plasma to treat elderly patients with COVID-19 within 72 hours of onset of mild symptoms. To be included in this trial, patients had to be either over 75 years of age or 65-74 years old with one underlying condition. Additionally, patients had to have pre-specified symptoms for less than 48 hours. Individuals randomly assigned to the treatment arm were administered high titer convalescent plasma (IgG titer >1:1000). For the primary end point of the study, which was severe respiratory disease, the relative risk comparing those treated with convalescent plasma to those treated with placebo was 0.52 (95% CI 0.29 to 0.94). This risk reduction was markedly greater in individuals receiving donor plasma with an antibody titer higher than the median of 1:3200. Anti-SARS-CoV-2 IgG antibody titers in recipients were measured 24 hours after treatment, and they were significantly higher in the treatment arm than in the control arm. These results suggest that early treatment with convalescent plasma may be a simple and relatively inexpensive way to protect elderly individuals against disease progression.

Impact of age, ethnicity, sex and prior infection status on immunogenicity following a single dose of the BNT162b2 mRNA COVID-19 vaccine: real-world evidence from healthcare workers, Israel, December 2020 to January 2021

This study based in Israel aimed to assess immunogenicity after receiving one dose of the BNT162b2 mRNA vaccine, by measuring anti-spike IgG levels. Antibody levels were measured at 21 days for the 514 healthcare workers who participated in the study; baseline IgG levels were tested before vaccination in 385 participants. Anti-SARS-CoV-2 spike IgG antibodies were detected in 92% (n=475) of participants and geometric mean concentration (GMC) was found to be 68.6 AU/mL. The participants who did not respond to the first mRNA vaccine (n=39) were more likely to be Jewish and were older in age, (57 vs. 45). There was no significant difference in antibody titres among individuals of different ethnicities and sexes, but results show a decrease in titres with increasing age. Individuals with prior SARS-CoV-2 infection had increased IgG levels post-vaccination compared to others (GMC 573 vs. 61.5). Post-vaccination IgG levels did not change from the time of a positive test to vaccination among participants with a history of a positive PCR test. Overall, results show that ethnicity and age could be related to non-response, but additional studies with larger sample sizes are needed to further examine this finding.

Early initiation of prophylactic anticoagulation for prevention of coronavirus disease 2019 mortality in patients admitted to hospital in the United States: cohort study

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This observational cohort study used data from the US Department of Veterans Affairs to understand the effects of prophylactic anticoagulation on 4279 patients hospitalized with COVID-19 between March and July 2020. Of the 84% of patients who received prophylactic anticoagulation in the first 24 hours of hospital admission, the most common drugs administered were heparin-based. For these patients, cumulative incidence of mortality at 30 days was 14.3%, and risk of death within the first 30 days was 27% lower than those who did not receive anticoagulation. Patients who received prophylactic anticoagulation also experienced a lower risk of in-hospital mortality and initiation of therapeutic anticoagulation, a proxy for clinical deterioration. This effect was similar across both commonly administered heparin anticoagulation methods. Reduction in risk among patients who were not admitted to the ICU within the first 24 hours of hospital admission were greater than patients who were admitted to the ICU. Prophylactic anticoagulation was not associated with an increased risk of bleeding. These results make a case for the use of prophylactic anticoagulation as an early treatment for hospitalized patients with COVID-19.

**BIOENGINEERING**

Sensitivity evaluation of 2019 novel coronavirus (SARS-CoV-2) RT-PCR detection kits and strategy to reduce false negative\(^8\)

Wang et al. compared the sensitivity of five RT-PCR detection kits for the SARS-CoV-2 virus and proposed strategies to reduce the risk of false negative results, especially for mixed sample detection. The authors reported that each kit had significantly different limits of detection, depending on the target gene of each kit. For example, the sensitivity for detection of the open reading frame 1ab gene (ORF1ab) was lowest compared to the nucleocapsid (N) and envelope (E) genes. It was suggested detection kits with lower sensitivity should be used in conjunction with a validation kit with higher sensitivity to reduce the risk of false negatives. For specimens with inconclusive results, such as amplification in a suspicious interval region, continuous amplification can be used to increase the detection rate of low viral load specimens and reduce the false negative rate of SARS-CoV-2 detection.

Analysis of SARS-CoV-2 antibodies in COVID-19 convalescent blood using a coronavirus antigen microarray\(^10\)

Assis et al. developed a SARS-COV-2 antigen to serve as a diagnostic tool, an epidemiologic tool to estimate the disease burden of COVID-19 more accurately, and a research tool to correlate antibody responses with clinical outcomes. This microarray was printed with 61 antigens associated with SARS-CoV-2, SARS-CoV, MERS-CoV, common cold coronaviruses, and multiple other respiratory infection antigens that cause flu-like symptoms. The study determined the optimal binding antibody assay to discriminate SARS-CoV-2 convalescent sera from pre-pandemic sera contained the S2 and NP antigens for IgG (specificity = 1, sensitivity = 0.944) and the S1, S2, and NP antigens for IgA (specificity = 0.895, sensitivity = 0.944). Larger combinations of antigens were associated with decreased predictive power. The serodiagnosis performance of the assembled panel was validated as early as 7 days post symptom onset. This platform also revealed
cross-reactivity of antibodies that gives insight into SARS-CoV-2 pathology 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
Accesocovid.com

**Note on this Document:** This document was assembled by undergraduate and doctoral students attending the University of California, Los Angeles and the University of California, San Francisco with the intent of facilitating the rapid dissemination of information to the global community. Micaela Reyna, Shivali Joshi, Alyssa Bercasio, Masih Babagoli, Mariam Carson, Alicya Burt, Passa Pungchai, and Yilian Wang contributed to these summaries. This work is volunteer based.

**References:**


