COVID-19 Research Watch
January 18-22, 2021

CLINICAL PRESENTATION AND MANAGEMENT

Convalescent plasma antibody levels and the risk of death from Covid-19
This retrospective study explored the effectiveness of convalescent plasma with anti-SARS-CoV-2 IgG antibodies as a treatment for COVID-19. Using a US national registry, 3802 patients with data on IgG antibody levels were included in the study. From this sample, death within 30 days of plasma transfusion occurred for 22% of the patients who received a high-titer of antibody levels, 27.4% for patients who received a medium-titer, and 29.6% for patients who received a low-titer. The authors also evaluated the use of mechanical ventilation in conjunction with convalescent plasma therapy. When comparing patients in the high-titer group to the low-titer group, they found the relative risk of death to be 0.66 for patients who did not receive mechanical ventilation. For patients who received mechanical ventilation, there was no statistically significant difference in risk of death, with a relative risk of 1.02. The findings for this study provide insight into treatment for SARS-CoV-2-positive patients, suggesting that the earlier a patient receives a high-titer of antibodies in convalescent plasma, the lower the risk for death.

Development and validation of the ISARIC 4C Deterioration model for adults hospitalised with COVID-19: a prospective cohort study
The authors created and validated an multivariable linear regression prognostic model to predict the risk of clinical deterioration in hospitalized acute COVID-19 patients. The model included 11 readily available clinical predictors, derived from literature and previous prognostic scores. These predictors were defined a priori by a large, multi-site consortium of international experts. The model was tested on 74,944 patients from February 6 to August 26, 2020, across 260 hospitals in England, Scotland and Wales. Across regions, the model showed good discrimination, calibration and clinical utility. Overall, the model may be a strong tool for evaluating patients at-risk of clinical deterioration due to COVID-19, and inform future clinical decision-making.

NON-CLINICAL TRENDS

Reductions in 2020 US life expectancy due to COVID-19 and the disproportionate impact on the Black and Latino populations
This study aims to highlight the disproportionate impact of COVID-19 on the life expectancy of Black and Latino populations. An analysis of life expectancy values at birth and at 65-years for the total US population in 2020 was conducted under four projected scenarios of death by race and ethnicity. One scenario included mortality projections had the COVID-19 pandemic not occurred and the other three projections were ofCOVID-19 mortalities through December 31, 2020 based on three different scenarios (high, medium, and low mortality based on masking practices) modeled by the Institute for Health Metrics and Evaluation. The medium estimate indicated a reduction in US life expectancy at birth of 1.13 years to 77.48 years, which is lower than any year since 2003. The authors also projected a 0.87-year reduction in life expectancy at age 65. Additionally, they estimated a 2.2-year decline in life expectancy at birth for Latino populations and 3.05-year decline for Black populations compared to a 0.68-year reduction for White populations. These estimates suggest that the Black to White life expectancy gap would grow from 3.6 years to over 5 years, an increase
of nearly 40%. Meanwhile, the 3-year survival advantage resulting from the epidemiological “Latino paradox” would decrease to less than 1 year.

How Does Public Knowledge, Attitudes, and Behaviors Correlate in Relation to COVID-19? A Community-Based Cross-Sectional Study in Nepal

This community-based cross-sectional study aimed to assess knowledge, attitudes and practices (KAP) toward COVID-19 among the general public in Nepal and to identify associated factors. Between May and June of 2020, 645 patients were recruited from 26 hospitals across Nepal. Telephone interviews were conducted using a questionnaire with a maximum score of 27. The COVID-19 knowledge mean score was 11.6 (SD 4.5) and differed significantly among participants by province, place of residence, ecological area, age, gender and caste or ethnicity. The overall mean score was 2.7 (SD 1.8) for attitudes and 9.9 (SD 1.93) for practice, both of which also differed across groups. There was a positive correlation between knowledge-practice ($r=0.19$, $p<0.01$) and attitude-practice ($r=0.08$, $p<0.05$); however, they were weak. There was a stronger relationship between knowledge and education ($r=0.34$, $p<0.01$) and knowledge was positively correlated with participants province. Attitude was positively correlated with participants’ education level, while practice was positively correlated with gender and education. All other factors measured showed a negative correlation with KAP. These findings suggest the general public in Nepal has been following precautionary practices to reduce spread of SARS-CoV-2, despite relatively low levels of knowledge about the virus; however, the authors suggest a need for targeted community awareness interventions to enable improvements in attitudes and practices toward COVID-19 amongst the most vulnerable populations.

SCREENING AND TESTING

Comparison of Saliva and Nasopharyngeal Swab Nucleic Acid Amplification Testing for Detection of SARS-CoV-2 A Systematic Review and Meta-analysis

This systematic review assessed the diagnostic accuracy of saliva and nasopharyngeal (NP) swab nucleic acid amplification testing (NAAT) for detection of SARS-CoV-2 and diagnosis of COVID-19. Eight peer-reviewed studies and 8 preprints were included in the meta-analyses with a total of 5922 patients included. Fifteen of the studies included ambulatory patients, while 9 exclusively enrolled from an outpatient population with mild or no symptoms. The authors found that the saliva NAAT pooled sensitivity was 83.2% with a pooled specificity of 99.2%. The performance was similar to that of the NP swab NAAT testing, which had a sensitivity of 84.8% and a specificity of 98.9%. These findings support larger-scale research on the use of saliva specimens for NAAT as an alternative to NP swab specimens. The authors conclude that given the ease of sample procurement and increased patient comfort, testing centers should consider adopting saliva as their first sample choice, particularly during mass community screenings.

Evaluation of Abbott BinaxNOW rapid antigen test for SARS-CoV-2 infection at two community-based testing sites – Pima County, Arizona, November 3-17, 2020

The US Food and Drug Administration has granted Emergency Use Authorization for the BinaxNOW rapid antigen test for COVID-19-symptomatic individuals. However, to understand the performance of the antigen test for asymptomatic persons, Prince-Guerra et al. compared real-time reverse transcription-polymerase chain reaction tests with the BinaxNOW rapid antigen test. The authors found the BinaxNOW test had a lower sensitivity comparing symptomatic (64.2%) to asymptomatic (35.8%) persons. Despite this, the specificity was high in both groups: 100.0% for symptomatic persons, and 99.8% for
asymptomatic persons. When comparing the performance of the BinaxNOW test in culture-positive specimens, the sensitivity for symptomatic persons was 92.6% and for asymptomatic persons, 78.6%. The high specificity observed in this study indicates that the BinaxNOW antigen test may be useful for the quick detection and isolation of infectious individuals.

NON-PHARMACEUTICAL/PUBLIC HEALTH INTERVENTION

**Mask-wearing and control of SARS-CoV-2 transmission in the USA: a cross-sectional study**

This cross-sectional study looked at associations between self-reported and state-mandated face mask-wearing and social distancing related to SARS-CoV-2 transmission in the USA. Online surveys regarding mask usage were administered randomly to US citizens aged ≥13 years. Survey responses were combined with publicly available reproductive number (RT) estimates and measures of social distancing, community demographics, and other potential sources of confounding. The results from 378,207 respondents showed an increase in reported mask usage across the USA between June-July 2020, although usage varied by community. There was a 10% increase in self-reported mask-wearing associated with increased odds of transmission (OR 3.53). Communities with high reported mask-wearing and social distancing had the highest predicted probability of transmission control. There was no significant change in transmission after social distancing mandates were introduced, however, they increased with higher levels of mask-wearing. The authors concluded that the use of face masks combined with social distancing increased the control of transmission of SARS-CoV-2 and recommend additional public health interventions to increase uptake in infection control measures and reduce further transmission of the virus.

**Exposome changes in primary school children following the wide population non-pharmacological interventions implemented due to COVID-19 in Cyprus: a national survey**

In June 2020, Konstantinou et al. surveyed the parents of 1509 primary school-aged children across 180 schools in Cyprus to inquire about children’s exposome (environmental exposures during one’s lifetime) profile before and after the national COVID-19 lockdown. Results showed strong compliance with public health interventions, with 73% of children having increased hours spent at home during the week, 85% having fewer social contacts at school, and 74% having increased hand washing practices post-lockdown; however only 48% reduced their exposure to vulnerable contacts at home in the post-lockdown period. Following lockdown, an increase in sugar consumption by children (from 33% to 37%), increase in screen time (from 10% to 25%), and increase in sedentary behaviour (from 9% sitting down during school break to 46%) were reported. Authors emphasize the importance of considering potential indirect health impacts of non-pharmaceutical interventions to avoid future health risks.

**Communicating Awareness About COVID-19 Through Songs: An Example From Ghana**

Thompson et al. studied the use of songs for spreading knowledge about COVID-19 in Ghana by searching YouTube for songs and conducting a thematic analysis of the lyrics. All 28 songs included in the study contained information about how to prevent COVID-19 and most of the songs were in multiple languages. The eight main themes discovered were as follows: “public health guidelines”, “COVID-19 is real and not a hoax”, “COVID-19 is infectious”, “prayer as a method to stop the virus”, “emotional responses and disruption of everyday activities”, “verbally expelling the virus”, “call for unity and collective efforts”, and
“inspiring hope”. The authors noted that songs can be used to quickly share information about public health crises and examining song lyrics can be helpful for understanding attitudes towards COVID-19.

PATHOPHYSIOLOGY

Seroprevalence and asymptomatic carrier status of SARS-CoV-2 in Wuhan City and other places of China

Duan et al. conducted a retrospective cohort study in Wuhan City and 29 other Chinese provinces to analyze SARS-CoV-2 and SARS-CoV-2-specific IgM/IgG antibody positivity rate among asymptomatic individuals from March 6th to May 31st, 2020. They utilized commercial colloidal selection kits to assess a cohort of 63,107 healthy individuals to assess the correlation between presence of IgG and IgM antibodies and sex, age group, and geographic location, as well as to identify the proportion of the population who were asymptomatic carriers. It was found that women were more susceptible to the disease with higher odds of antibody positivity compared to men (0.91% vs. 0.60% for IgG; 0.22% vs 0.16% for IgM; p=0.105). The highest prevalence of IgG antibodies was found among people aged 50 and older (2.09%), followed by those aged 41-50 (1.00%) and those aged less than 20 years (.36%), suggesting that being infected became more likely with increasing age. Geographically, seroprevalence of SARS-CoV-2 was 0.38% in Mainland China (excluding Wuhan), 0.59% in Hubei Province (excluding Wuhan), and 1.68% in Wuhan City, implying a higher infection rate in the latter. These findings suggest that SARS-CoV-2 may remain in a population even after the elimination of clinical cases due to large numbers of asymptomatic carriers.

PHARMACEUTICAL INTERVENTION

Computational drug repurposing strategy predicted peptide-based drugs that can potentially inhibit the interaction of SARS-CoV-2 spike protein with its target (humanACE2)

Egieyeh et al. researched the Drug Bank to identify drugs that could be repurposed to bind to the interaction surface of the human angiotensin binding enzyme 2 (hACE) receptor. The researchers simulated molecular docking, dynamics and protein interactions to help pinpoint possible inhibitors of the protein-protein interaction between the spike protein on SARS-CoV-2 and the hACE receptor. Initially, it was found that the root mean squared fluctuation (RMSF), or flexibility of the of the protein-protein interaction, was .622 Angstroms, indicating that there was moderate flexibility in the complex between the virus and hACE2. Utilizing the Drug Bank, researchers identified proteins that had molecular docking ability based on the flexibility and binding affinity to the hACE2 receptor. It was found that the Sar9 Met (O2)-11-Substance complexed with the hACE2 receptor well, and BV2 was also identified to potentially limit interactions between SARS-CoV-2 and hACE2. Ultimately, the study asserts that these drugs could be studied in vitro or vivo to try to prevent COVID-19 infection cost-effectively.

TRANSMISSION PATTERNS

Prospective Longitudinal Serosurvey of Health Care Workers in the First Wave of the SARS-CoV-2 Pandemic in a Quaternary Care Hospital in Munich, Germany


Weinberger et al. conducted a prospective longitudinal study of 300 health care personnel in the LMU Munich University Hospital from March 24th until July 7th, 2020. Participants were monitored with antibody assays and questionnaires. The findings suggested that healthcare workers working in patient care in COVID-19 and non-COVID-19 wards both had a higher rate of SARS-CoV-2 seroconversion than those working in the emergency department and those who were not frontline workers. Both the degree and frequency of contact with SARS-CoV-2-infected persons were associated with higher rates of seroconversion among healthcare workers. Additionally, the authors found staff infections in COVID-19 wards to be independent of each other, while staff infections occurred in clusters in the regular non-COVID-19 wards.

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. Alyssa Bercasio, Deandra Lee Graham Hinchcliffe, Hannah Thomas, Maya Ganeshan, and Sarah Gallalee contributed to these summaries. This work is volunteer based.

References:
