COVID-19 Research Watch
September 28, 2020

NON-CLINICAL TRENDS

Young people’s views on their role in the COVID-19 pandemic and society’s recovery from it

Fifteen young people (YP) aged 11 to 18 years in the United Kingdom participated in a focus group discussion on their role in the COVID-19 pandemic. Four key themes emerged from the discussion: (1) YP are aware of the risks and impact of the pandemic on society, including the elderly, parents, school staff, and other vulnerable groups; (2) YP are aware of the impact of the pandemic on their own lives from school closures, suspended grades, and social isolation; (3) YP supported school reopening but are concerned about the risks and (4) YP stressed the importance of their right to information on the pandemic, including having information on the pandemic that is understandable to them. Overall, YP expressed interest in playing an active role in helping with the goals of pandemic resolution and societal changes but felt inhibited by the lack of opportunities for their group and the complex nature of the information being disseminated. The authors suggest that their findings answer the question posed in Journal of Medical Ethics’s article “Children of COVID-19: pawns, pathfinders or partners?” by Larcher et al and to consider YP as partners in the pandemic.

Decreased Influenza Activity During the COVID-19 Pandemic – United States, Australia, Chile, and South Africa, 2020

Data from 300 clinical laboratories across all 50 U.S. states indicated a 61% decrease in the number of influenza specimens submitted and a 98% decrease in influenza activity from the time periods September 29, 2019 – February 29, 2020 to March 1, 2020 – May 16, 2020. Summer circulation (May 17 – August 8, 2020) of influenza in the United States is also lower compared to previous years (median = 0.20% tests positive in 2020 vs. 2.35% in 2019, 1.04% in 2018, and 2.36% in 2017). Furthermore, influenza data for June – August 2020 from three Southern Hemisphere countries (Australia, Chile, and South Africa) indicates very low influenza activity during the months that typically constitute the Southern Hemisphere influenza season. Overall, this data indicates that community mitigation efforts targeted towards COVID-19 are associated with a decline in influenza circulation. The study authors encourage both individuals and countries to nevertheless prepare for seasonal influenza circulation during the fall and winter of 2020.

Indirect effects of the COVID-19 pandemic on malaria intervention coverage, morbidity, and mortality in Africa: a geospatial modelling analysis

This study utilized geostatistical modelling and survey data on parasite rates surveys, insecticide-treated net (ITN) coverage rates, and effective treatment rates to evaluate the indirect effects of COVID-19 on malaria interventions in African countries across a plausible range of hypothetical scenarios. Study researchers then estimated resultant changes in malaria incidence and mortality. In a baseline scenario of undisrupted intervention coverage, study researchers estimated roughly 215 million malaria cases and 386 thousand deaths in malaria-endemic African countries in 2020. The study model predicted greater case and mortality rates with greater reductions in antimalarial drug access and ITN distributions. The study researchers call for an integration of malaria control efforts with the COVID-19 response in African countries.
Short-term and long-term health impacts of air pollution reductions from COVID-19 lockdowns in China and Europe: a modelling study

Researchers integrated observations of fine particulate matter (PM$_{2.5}$) concentrations from over 2,500 stations in Europe and China throughout 2016–2020 with chemical transport model simulations to recreate PM$_{2.5}$ fields at high spatiotemporal resolution to explore the short and long-term mortality averted from COVID-19 restrictions. The authors found a reduction in population-weighted PM$_{2.5}$ of 14.5 μg m$^{-3}$ in China (−29.7%) and 2.2 μg m$^{-3}$ in Europe (−17.1%). In the short term, an estimated 24,200 (95% CI 22,380 - 26,010) deaths were avoided throughout China from Feb 1 to March 31, and 2,190 (95%CI 1,960-2,420) deaths were averted in Europe from Feb 21 to May 17. Long term, between 76,400-287,000 premature PM$_{2.5}$ concentration-related fatalities were averted in China and 13,600-29,500 in Europe depending on scenarios of economic recovery. These findings suggest that substantial air quality improvements could be achieved with stricter emission control.

MODELS

Clinical Impact, Costs, and Cost-Effectiveness of Expanded SARS-CoV-2 Testing in Massachusetts

This modelling study evaluated the clinical outcomes and cost of three different COVID-19 testing strategies in Massachusetts: (1) testing those whose symptom severity requires hospitalization; (2) testing those who have a COVID-19-related symptom; (3) testing those with COVID-19-related symptoms and testing the entire population, including asymptomatic individuals, once); and 4) testing those with COVID-19-related symptoms and testing the entire population, including asymptomatic individuals, monthly. The authors’ model displayed 64% fewer cases in Massachusetts for strategy (4) compared to strategy (1) and 46% fewer deaths, with R$_e$ = 0.9. All Re values resulted in 1.8 to 2.6 times less mortality for strategy (4) compared to strategy (1). However, this test strategy would only be cost effective (defined as an incremental cost effectiveness ratio <$100,000 per quality adjusted life year averted) if R$_e$ = 1.6. If the test cost was ≤$3 USD, testing the entire population every two weeks would be cost effective at any R$_e$ value. The authors suggest that widespread low-cost testing would reduce disease, hospitalization, and mortality.

Immune life history, vaccination, and the dynamics of SARS-CoV-2 over the next 5 years

Researchers adopted the SIR(S) model to explore how the pandemic course, particularly the magnitude and timing of future SARS-CoV-2 infections with seasonal drivers and NPIs, might develop for different expectations of the adaptive immune response. The key findings were that variations in the primary immune response to SARS-CoV-2 and a vaccine could lead to drastically different immune landscapes and critical case burdens, from sustained epidemics to near elimination. In locations with suspected seasonal transmission variation, such as New York City, the model predicts reduced susceptibility to secondary infection or a longer duration of immunity leading to a greater secondary infection peak. This trend is suppressed in areas with smaller climate fluctuations. The pattern of infection peaks is significantly more sensitive to the relative fraction and transmissibility of primary and secondary cases, as well as the fraction of severe cases for each category, highlighting the importance of immunological characterization beyond the measurement of active infections for immune landscape projection of SARS-CoV-2 infections.
Clinical features of COVID-19 mortality: development and validation of a clinical prediction model

This study developed a prediction model for assessing clinical characteristics that impacted COVID-19 mortality based on a machine learning algorithm, XG boost, which was applied to a large cohort of patients treated in the Mount Sinai Health System in New York City. This model displayed that the parameters of age, minimum oxygen saturation, and clinical setting (i.e. telehealth, outpatient, inpatient) demonstrated high accuracy (91%) for predicting death for both retrospective and prospective patients. Using these three features, which were consistent across different algorithmic models, this study may have implications to guide management and prognoses for COVID-19 patients, though external validation in other populations is required.

CLINICAL PRESENTATION & MANAGEMENT

Lung ultrasonography for risk stratification in patients with COVID-19: a prospective observational cohort study

Point-of-care lung ultrasound (LUS) is a diagnostic tool with the potential to shorten time to diagnosing acute dyspnoea and identify risk stratification. This study aimed to utilize LUS technology to understand risk characteristics in COVID-19 patients. The study included adult patients (age ≥18) with acute lower respiratory tract infection and confirmed COVID-19 via a positive RT-PCR test. Eighty patients were included in the study and 73 patients had an abnormal LUS (p=0.003). Patterns seen on the LUS in the order of decreasing severity included: the thickening of the pleura with pleural line irregularities, confluent B lines, pathological B lines, and consolidations. Each patient was also classified into three groups based on post-7-day outcome: 1) outpatients 2) hospital admission 3) intubation. The involved zones proportion in the LUS was decreased in outpatients compared to other groups. Overall, this study found LUS to be a cost-effective and simple tool for early risk stratification in ED patients with COVID-19.

Reduced maximal aerobic capacity after COVID-19 in young adult recruits, Switzerland, May 2020

This study aimed to better understand the effects of COVID-19 on the physical fitness of young Swiss adults. This study included 173 men and 26 women with a median age of 21 years and a confirmed test of SARS-CoV-2. Aerobic endurance, trunk muscle, and upper extremity strength were measured. After measuring physical endurance, a decrease in VO2 max (aerobic capacity) was found in participants with COVID-19 compared to asymptomatic and non-infected participants; however, physical strength was unaffected. Findings suggest that mild COVID-19 in young adults may lead to lung injury.
NON-PHARMACEUTICAL/PUBLIC HEALTH INTERVENTIONS

Poor self-reported adherence to COVID-19-related quarantine/isolation request, Norway, April to July 2020¹⁰
This prospective cohort study sought to understand self-reported adherence to requested quarantine and isolation requirements in Norway among adults aged 18 and older. A total of 1,704 individuals participated in successive online questionnaires between April and July 2020, reporting on demographics, symptoms, and adherence to quarantine or isolation measures requested by Norwegian health authorities. 40% of participants reported COVID-19-related symptoms and 9% reported testing positive for SARS-CoV-2. 574 quarantine or isolation requests were reported for approximately 25% of participants, and 417 quarantine or isolation events were reported. Of the participants receiving a request, 42% reported adhering to quarantine or isolation at least once and 65% reported not adhering to the request at least once. Adherence to requested quarantine and isolation decreased between April (66%) and May through July (33-38%) and those individuals with COVID-19-related symptoms reported higher adherence (71%) than asymptomatic participants (28%). Participants aged 18-29 reported higher adherence (72%) than those aged 30-49 (48%), 50-69 (24%) or 70-89 (36%). Despite the country’s laws specifying when quarantine and self-isolation is required and fines associated with non-compliance, these findings of low adherence in Norway suggest the strategy should be evaluated and communicated more clearly to the public.

PEDIATRIC PRESENTATION

Infant Outcomes Following Maternal Infection with SARS-CoV-2: First Report from the PRIORITY Study¹¹
The authors used a prospective US registry of 263 infants to study infant outcomes after maternal SARS-CoV-2 infection; 179 mothers tested positive (82% were symptomatic) for SARS-CoV-2 infection and 84 mothers tested negative (63% were symptomatic) during pregnancy or during the first six weeks postpartum. Maternal SARS-CoV-2 status was not associated with adverse outcomes such as preterm birth, NICU admission, or respiratory disease through eight weeks of age. Infants born to mothers who tested positive 0-14 days before delivery were more likely to be admitted to the NICU and were more likely to be born earlier than those born to mothers who tested positive more than 14 days prior to delivery; however, these associations should be studied further as timing of testing was determined at hospitals and may not have been related to onset of illness but to management practices. The estimated incidence of a positive test among infants born to mothers who had tested positive was low at 1.1%; this finding is reassuring because the infants did well, but infant incidence should also be studied further because infant testing was incomplete in this study.
UNIVERSAL TESTING AND SCREENING

Yeungnam University type drive-through (YU-Thru) coronavirus disease 2019 (COVID-19) screening system: a rapid and safe screening system12

The authors compared the conventional screening system (CSS) implemented at the beginning of the outbreak in South Korea to the Yeungnam University type drive-through (YU-Thru) screening system; in the YU-Thru system, individuals get screened via a drive-through process in which the individual is registered, given a medical examination by a physician, payment is processed, and a sample is collected (the staff and medical personnel remain almost entirely in shipping containers during the first three steps and perform only the sample collection outside the shipping container). With CSS, the average number of tests per day were 50-60; with the YU-Thru system, up to 350 tests per day are conducted and the system takes 2-4 minutes to test an individual. Other benefits of the YU-Thru system: reduced risk of transmission between patients and clinicians because patients remain in their cars, reduction in testing time because there was no longer a need to clean and ventilate testing rooms, patients no longer needed to wait in line in the cold and close together for long periods of time, and the YU-Thru system can be easily constructed in parking lots.

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. Alexandra Keir, Guntas Padda, Caihla Petiprin, Jane Fieldhouse, Canice Christian, Carina Ashkar, and Sarah Gallalee contributed to these summaries. This work is volunteer based.
References: