COVID-19 Case Investigation and Contact Tracing Efforts from Health Departments — United States, June 25–July 24, 2020

Spencer et al. studied case investigation and contact tracing data from 56 CDC-funded state, local, and territorial health departments between June and July 2020. Using SAS software, the authors performed descriptive analyses to identify associations between SARS-CoV-2 transmission and four key metrics: 1. average caseload per case investigator, average tracing load, and staffing method, 2. case investigation timeliness, 3. contact tracing timeliness, and 4. contact tracing yield. The results showed a median of 57% of patients were interviewed within 24 hours of the case report and an average of 1.15 contacts were identified per patient to trace, of which 55% were notified within 24 hours of identification by the patient. All health departments with higher caseloads showed lower percentages of patients interviewed in the first 24 hours and lower numbers of contacts identified per interview. Thus, this study demonstrates an association between timeliness and caseload and reinforces the significance of increasing staffing and enhancing awareness regarding state and local health department contact tracing workload.

Associations of Government-Mandated Closures and Restrictions With Aggregate Mobility Trends and SARS-CoV-2 Infections in Nigeria

Erim et al. performed a cross-sectional analysis of the effects government-mandated closures and restrictions had on aggregate mobility and SARS-CoV-2 infections in Nigeria. Closures were initiated on March 30, 2020, with a partial ease starting on May 4, 2020. Mobility data was collected through Google (Alphabet) between February 27 and July 21, 2020 using aggregated and anonymized mobile device location data, and SARS-CoV-2 infection data was collected through the Nigeria Center for Disease Control. Mobility data was provided as the percentage change in movement compared to baseline between January 3 and February 4, 2020, across six categories (retail and recreation, grocery and pharmacy, parks, transit stations, workplaces, and residential). Associations of closures and restrictions with aggregate mobility were performed through interrupted time series regression models and showed negative associations throughout all 6 categories except residential, for which there was a positive association. Most associations reversed after May 4, 2020. Associations of closures and restrictions with confirmed SARS-CoV-2 infections were analysed through negative binomial regression models and showed that every percentage point increase in aggregate mobility was associated with higher incidences of infection in residential areas, transit stations, and workplaces. The government-mandated closures were estimated to have averted up to 58 million cases over the study period.
Change in Reported Adherence to Nonpharmaceutical Interventions During the COVID-19 Pandemic, April-November 2020

The authors of this study investigated changes in the adherence to non-pharmaceutical interventions in the US during the months of April-November. The researchers measured adherence by analysing survey responses from the Coronavirus Tracking Survey (CTS), which was administered from April 1, 2020 to November 24, 2020. The participants of this study were recruited from the Understanding America Study and consisted of residents from all U.S. Census regions. Participants of the study completed the CTS survey every 14 days. The researchers of the study created a non-pharmaceutical intervention adherence index (NPI) which ranged from 0 (low adherence) to 100 (high adherence). The study showed a considerable decrease in the NPI index from 70 in April to 50 in June, followed by an increase to 60 in November. Adherence to individual non-pharmaceutical interventions decreased the most, though there was an increase in mask wearing. The results of the study have implications regarding the public health messaging around NPIs, and the concept of pandemic fatigue. The authors suggest future work is needed regarding methods to combat pandemic fatigue.

NON-CLINICAL TRENDS

Socioeconomic Disparities in Patient Use of Telehealth During the Coronavirus Disease 2019 Surge

This study evaluated factors associated with telehealth usage in the Department of Otolaryngology-Head and Neck Surgery at the Henry Ford Health System in Michigan. Between March 17 to May 1, 2020, virtual, telephone, and in-person visits as well as no-shows were analyzed. Those who were older, had Medicare insurance, and were in the two lowest quartiles of household income were less likely to complete a virtual visit compared to telephone or in-person visits before and after adjustment for age, sex, insurance type (including Medicaid, public insurance, and no insurance status), and household income. In univariate analyses comparing those who completed a virtual or telephone visit to those who were no-shows, those in the lowest two quartiles of median household income, Black patients, and patients with Medicaid, no insurance, or other public insurance had a lower likelihood of completing a virtual or telephone visit. Overall, these results indicate the importance of considering variables that impact patients’ participation in telehealth differs to improve access to appropriate healthcare.
CLINICAL PRESENTATION AND MANAGEMENT

Association of Smoking and Cumulative Pack-Year Exposure With COVID-19 Outcomes in the Cleveland Clinic COVID-19 Registry

Lowe et al. investigated the impact of cumulative smoking exposure on COVID-19 outcomes using data from 7102 patients in the Cleveland Clinic COVID-19 Registry. Cumulative smoking exposure was categorized as those who were never smokers, those with 0 to 10 pack-years, those with 10 to 30 pack-years, and those with greater than 30 pack-years. The results demonstrated a dose-response relationship between smoking exposure and COVID-19 outcomes. Compared to never smokers, those with greater than 30 pack-years had an odds ratio of 2.25 for hospitalization given a positive COVID-19 test, an odds ratio of 1.69 for ICU admission given hospitalization, and an odds ratio of 1.89 for death given a positive COVID-19 test before and after adjusting for age, race, and gender. These associations were reduced after adjusting for coronary artery disease, hypertension, chronic obstructive pulmonary disease, diabetes, angiotensin receptor blockers, and oral or inhaled corticosteroids; however, there was still a statistically significant residual impact of smoking on the odds ratio of hospitalization given a positive COVID-19 test.

Clinical Characteristics and Outcomes of Hospitalized Women Giving Birth With and Without COVID-19

Jering et al. studied clinical characteristics and outcomes of 406,446 women hospitalized for childbirth between April 1 and November 23, 2020 using de-identified data from the Premier Healthcare Database. 1.6% of the women (n=6380) had COVID-19 and were more often Black and/or hispanic, younger, and had diabetes and/or obesity than the women without COVID-19 (n=400066). When comparing clinical outcomes between women giving birth with and without COVID-19, in-hospital mortality (141 vs 5 deaths per 100000 women), rates of myocardial infarction and venous thromboembolism (0.1% vs 0.004% and 0.2% vs 0.1%, respectively), odds of preeclampsia (aOR=1.21), and odds of preterm birth (aOR=1.17) were all higher in those with COVID-19. Additionally, age (OR=1.91 per 10 years), morbid obesity (OR=3.85), diabetes (OR=4.51), kidney disease (OR=21.57), eclampsia (OR=116.1), thrombotic events (OR=45.10), and stillbirths (OR=7.88) were found to be associated with mechanical ventilation use and/or in-hospital death among women with COVID-19 who gave birth. These results suggest the need to minimize risk within COVID-19 infected pregnant women and to include this patient population in future studies of treatments and vaccines.
Rates of COVID-19-Related Outcomes in Cancer Compared with Non-Cancer Patients

As increasing literature has identified cancer patients as a high-risk group for developing severe COVID-19, this study sought to compare infection outcomes between 67 cancer patients to 256 non-cancer patients from a larger cohort identified prior to the start of the pandemic. Out of all confirmed COVID-19 cases, cancer patients made up 20.7% of all infections. The cancer patients with COVID-19 were significantly more likely to be older, male, and have a history of smoking compared to their non-cancer counterparts. After full adjustment for demographics, smoking, and significant comorbidities, cancer was associated with significantly greater odds of hospitalization from COVID-19 (aOR=2.16) and greater 30-day mortality (aOR=5.67), but not ICU admission. These associations for poor outcomes were strongest in Black patients and patients with active cancer at the time of study instead of in remission. These results support pre-existing data that cancer remains an independent risk factor for COVID-19 infection even when accounting for other individual risk factors.

PHARMACEUTICAL INTERVENTIONS

Effect of anakinra versus usual care in adults in hospital with COVID-19 and mild-to-moderate pneumonia (CORIMUNO-ANA-1): a randomised controlled trial

The authors of this study evaluated how a recombinant human interleukin-1 (IL-1) receptor antagonist, called anakinra, affected health outcomes for COVID-19 patients who did not require ICU admission and had mild-to-moderate pneumonia. Between April 8-26, 2020, 153 patients from 16 hospitals in France were screened for eligibility criteria, with 116 total recruited and stratified by healthcare center. 59 patients were randomly assigned to the arm receiving an anakinra regimen in addition to usual care, and 57 patients were randomly assigned to the control group, receiving the usual care. Patients were evaluated at days 4, 6, 14, 28, and 90. Analytical methods, including Bayesian monitoring and sensitivity analyses, were used to determine primary outcomes. The authors found that 47% of patients in the anakinra group required ventilation or had died by day 14, compared to 51% of patients in the control group. No significant difference was found in the biological parameters of the anakinra and control groups, including decreases in serum C-reactive protein level or changes in lymphocyte counts. Overall, the authors concluded that anakinra was not efficacious in treating mild-to-moderate COVID-19 pneumonia patients.
**SARS-CoV-2 501Y.V2 escapes neutralization by South African COVID-19 donor plasma**

In this study, authors evaluated the efficacy of monoclonal antibody therapeutics on a newly emergent strain of SARS-CoV-2 in South Africa, denoted 501Y.V2. The 501Y.V2 variant has nine mutations localized to the spike protein, which is the primary target of antibody therapeutics against SARS-CoV-2 infection. Four mutations are located within the N-terminal domain (NTD) of the spike protein, and three are located at the receptor binding domain (RBD). Using ELISA methods, the authors determined that the 501Y.V2 variant escaped class 1 monoclonal antibodies (which target epitopes located at the RBD). These antibodies primarily target the K417 residue on spike, which is also a mutation in 501Y.V2. The variant also escaped detection by class 2 antibodies, likely due to an E484K mutation in the RBD. Finally, a deletion of three amino acids in a supersite of 501Y.V2 displaced an NTD loop by 8Å, altering the binding domain for NTD neutralizing antibodies against SARS-CoV-2. Overall, these mutations resulted in resistance of the variant against convalescent plasma and sera, with 48% of plasma/sera samples failing to neutralize the virus. The authors suggest that vaccine developers should be aware of the resistance of 501Y.V2 against prominent monoclonal antibody therapeutics, as many vaccines in progress against SARS-CoV-2 also target spike.

* Please note all studies published in medRxiv and bioRxiv are preprints and have not yet undergone a rigorous peer review process.


From December 21, 2020 – January 10, 2021, 4,041,396 first doses of Moderna COVID-19 vaccine were administered in the US; following those doses, 1,266 (0.03%) vaccine recipients experienced adverse events. Of the adverse cases reported, 10 cases met the definition for anaphylaxis (2.5 cases of anaphylaxis per million); the median age in these cases was 47 years and all events occurred in females. Results reveal that 9/10 patients had symptom onset within 15 minutes and 1/10 after 30 minutes (median interval from vaccine administration to onset was 7.5 minutes). Of the 10 cases of anaphylaxis, 9 patients had a history of allergies or allergic reactions. No deaths were reported from anaphylaxis after receiving the Moderna COVID-19 vaccine. Of the 43 cases of non-anaphylaxis allergic reactions, 26 (60%) were categorized as non-serious, reactions were mainly reported in women (91%), and the median age reported was 43 years. Symptoms included itchy sensations in the mouth or throat, pruritus, rash, sensations of throat closure, and respiratory symptoms. The CDC advises that persons who experience immediate allergic reactions to the first dose of an mRNA COVID-19 vaccine should not receive a second dose. Vaccine locations must ensure observation periods and be prepared with resources and trained staff to immediately treat patients experiencing anaphylaxis symptoms and signs. Patients should also be advised to seek emergency care if they begin to experience symptoms or signs of an allergic reaction.
SCREENING AND TESTING

The Infectious Diseases Society of America Guidelines on the Diagnosis of COVID-19: Molecular Diagnostic Testing

The Infectious Diseases Society of America collaborated with a panel of experts and used the GRADE approach for evidence assessment to create a diagnostic guideline to assist medical personal, patients, laboratorians, and policymakers in decisions relating to the ideal use of SARS-CoV-2 nucleic acid amplification tests (NAAT). The panel of experts approved 17 recommendations for testing based on the systematic review data which can be viewed at: https://www.idsociety.org/practice-guideline/covid-19-guideline-diagnostics/. The recommendations touch on many circumstances, including testing among immunocompromised patients and testing prior to time-sensitive surgeries or aerosol generating procedures. The panel’s assessment found that nucleic acid testing is recommended for all symptomatic patients suspected of having COVID-19 and asymptomatic patients with known or suspected COVID-19 contact. The authors suggest that testing will be determined by additional factors such as the needs of the patients and institutional-specific resources.

MODELS

Model-informed COVID-19 vaccine prioritization strategies by age and serostatus

The researchers of this study employed a model to quantify the impact of COVID-19 vaccine prioritization. The researchers studied three different areas of variation: performance of the vaccine, susceptibility to infection and infection fatality, and population and policy. The study found that direct vaccination of adults over the age of 60 reduced mortality and years of life lost when COVID-19 transmission was high. In evaluating transmission, assuming that the vaccine is 90% effective, the model found that vaccinated adults aged 20-49 years minimized infections and the vaccination of individuals aged 60 or over always minimized years of life lost. The researchers also studied vaccine prioritization, given that the vaccine is less effective in older populations. Their findings supported the vaccination of adults 60 and older, as long as vaccine efficacy only began to decrease in individuals 70 years old and over. Bubar et al. also evaluated serological testing for vaccine prioritization, including two approaches where vaccination occurred regardless of serostatus and where vaccination depended on a negative serological test. The analysis found that prioritization of seronegative individuals for vaccination allowed for large reductions in cumulative incidence and mortality in areas with higher seroprevalence. The findings of the research study illuminate the importance of utilizing age-stratifying models to evaluate vaccine prioritization strategies.
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. Ilia Vasilopoulos, Masih Babagoli, Sabahat Rahman, and Alexandra Keir contributed to these summaries. This work is volunteer based.

References:


