CLINICAL PRESENTATION

Residential context and COVID-19 mortality among adults aged 70 years and older in Stockholm: a population-based, observational study using individual-level data

This population-based, observational study investigated how individual-level housing and neighborhood characteristics were associated with COVID-19 mortality in a sample of 274,712 adults aged 70 or older in Stockholm, Sweden. Between March 12 and May 8, 2020, 1,301 of the 3,386 deaths that occurred were due to COVID-19. Living individuals under 66 years of age compared to living with older adults (hazard ratio [HR] 1.6; 95% CI 1.3–2.0), living in a care home compared to living in independent housing (HR 4.1; 95% CI 3.5–4.9), and living in neighborhoods with the highest population densities compared to living in the least densely populated neighborhoods (HR 1.7; 95% CI1.1–2.4) were all associated with higher risk of COVID-19 mortality. Public health efforts should include strategies to address these factors.

Update: Characteristics of Symptomatic Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status- United States, January 22- October 3, 2020

From January 22 to October 3, 2020, data from the National Notifiable Diseases Surveillance System (NNDSS) was collected on laboratory-confirmed SARS-CoV-2 infections among women aged 15-44 years old. Of these patients, 5.7% of symptomatic women were pregnant. Pregnant women with confirmed SARS-CoV-2 were significantly more likely than non-pregnant SARS-CoV-2 women to be admitted to ICU (10.5 per 1000 vs. 3.9 per 1000), receive invasive ventilation (2.9 per 1000 vs. 1.1 per 1000), receive extracorporeal life support (0.7 per 1000 vs 0.3 per 1000) and die (1.5 per 1000 vs. 1.2 per 1000). Overall, pregnant women were at increased risk for severe SARS-CoV-2 illness. In light of these findings, the authors suggest pregnant women with suspected SARS-CoV-2 should seek prompt medical care to prevent potential complications from the virus.

MODELS

Modeling COVID-19 scenarios for the United States

This study modelled the spread of SARS-CoV-2 in the United States using the SEIR (susceptible, exposed, infectious, and recovered) framework, focusing primarily on the impact of non-pharmaceutical interventions and taking into account state level covariates such as pneumonia seasonality, mobility, testing rates, and face mask use. The authors evaluated the impact of three scenarios: (1) social distancing mandates being reinstated at the state level when there are more than 8 deaths per one million population (reference scenario); (2) universal mask wearing assuming 95% compliance with easing of social
distancing measures; (3) universal mask wearing assuming 85% compliance with social distancing measures in place. The authors predict that in the reference scenario, 511,373 cumulative deaths due to COVID-19 (95% CI: 469,578 - 578,347) could be observed in the United States by February 28th, 2021. Compared to the reference scenario, 129,574 (95% CI: 85,284 - 170,867) or 95,814 (60,731–133,077) deaths could be averted between September 22, 2020 – February 28, 2021 in the presence of 95% mask wearing or 85% mask wearing, respectively.

NON-CLINICAL TRENDS

Caregiver willingness to vaccinate their children against COVID-19: Cross sectional survey

In order to evaluate the willingness of caregivers to vaccinate their children against COVID-19 when a vaccine becomes available, Goldman et al. administered a cross-sectional survey to 1,541 caregivers of children in pediatric emergency departments in the USA, Canada, Israel, Japan, Spain, and Switzerland. Sixty-five percent of caregivers reported that they would vaccinate their child against COVID-19. Among those who provided reasons to vaccinate, top reasons include protecting the child (62%), protecting others (24%) and general vaccine acceptance (14%). Among those who were not willing to vaccinate, the novelty of the vaccine (52%), perceived low risk of SARS-CoV-2 infection of children (31%), and fear of side effects and safety (22%) were the top reasons provided. Overall, children who were older, with no chronic illnesses, with up-to-date vaccinations, a recent history of flu vaccine, and presenting to the emergency department due to caregiver concern that the child had COVID-19 were all factors related to intention to vaccinate. Fathers who completed the survey were more likely than mothers to report willingness to vaccinate their child. The study demonstrates potential barriers to vaccine uptake that should be addressed by public health efforts.

PATHOPHYSIOLOGY

Neopterin predicts disease severity in hospitalized patients with COVID-19

The authors assessed neopterin, a circulating immune marker of inflammation, as a predictor for COVID-19 among 115 patients with PCR-confirmed SARS-CoV-2 infection and available serum neopterin levels in Austria. In comparison to patients with lower neopterin levels (<45 nmol/L), patients with elevated levels of neopterin (>45 nmol/L) were significantly associated with higher risk of mortality during hospital stay due to COVID-19 (19% vs. 4.5%), need for mechanical ventilation (63.2% vs. 7.5%) during hospital stay, and higher risk for ICU admission (68.4% vs. 10.4%). The results indicate neopterin as a valid predictor for COVID-19, and this knowledge is important in the early identification and case management of patients with higher risk for severe COVID-19 illness.
**PEDIATRIC PRESENTATION**

*SARS-CoV-2 infections among children in the biospecimens from respiratory virus-exposed kids (BRAVE Kids) Study*[^6]

This study evaluated the impact of COVID-19 on 382 children and adolescents (<21 years) exposed to SARS-CoV-2 through the collection of exposure, demographic, and clinical records in North Carolina. Compared to uninfected children, SARS-CoV-2 infected children were more likely to be Hispanic (88% vs. 57%) and have an infected sibling (49% vs 29%), but they were less likely to have asthma (6% vs. 17%). Adolescents (13-21 years) were more likely to experience flu-like symptoms (61% vs 39%), have gastrointestinal symptoms (27% vs. 9%), and experience sensory symptoms (42% vs. 9%). Comparing asymptomatic and symptomatic children, there was no significant difference in age associated with nasopharyngeal viral load. The findings of this study indicate the need to further explore the factors associated with SARS-CoV-2 infection and illness in children of different ages.

**REGION-SPECIFIC LESSONS LEARNED**

*Beyond the 405 and the 5: Geographic variations and factors associated with SARS-CoV-2 positivity rates in Los Angeles County*[^7]

This ecological analysis sought to analyze the socio-structural factors associated with the spread of SARS-CoV-2 in areas of Los Angeles County (LAC). The predictor variables included in this analysis were age, race/ethnicity, poverty, insurance status, educational status, population density, and household density; the outcome variables included were age-adjusted testing rate, age-adjusted diagnosis rate, and the crude positivity rate. Overall, there were 843,440 tests conducted and 86,383 diagnoses reported in LAC between March 1 and June 30, 2020. Areas with a positivity rate greater than 5% had greater proportions of residents who were Latino, living below the poverty line, uninsured, and without a bachelor’s degree. Based on spatial models, factors associated with positivity rates included proportion of Latino residents, residents living below the poverty line, and household density. Age-adjusted diagnosis rates were associated with all of the aforementioned factors plus population density. There were no significant associations between the included predictor variables and age-adjusted testing rates. These differences within LAC support the need for targeted interventions for COVID-19.

**TRANSMISSION PATTERNS**

*Risk of hospital admission with coronavirus disease 2019 in healthcare workers and their households: nationwide linkage cohort study*[^8]

This cohort study assessed the risk of hospital admission due to COVID 19 among patient facing and non-patient facing healthcare workers and their household members in Scotland UK between March 1 to June 6, 2020. Of all hospital admissions for COVID-19 in working age people (aged 18-65), 17.2% were healthcare workers or people from their households. Risk of admission due to COVID-19 in non-patient facing healthcare workers
and their households was similar to the risk in the general population (hazard ratio [HR] 0.81, 95% CI 0.52-1.26 and HR 0.86, 95% CI 0.49-1.51, respectively). Patient-facing healthcare workers were at higher risk compared to non-patient-facing healthcare workers (HR 3.30, 95% CI 2.13-5.13), as were their household members (HR 1.79, 95% CI 1.10-2.91). Those who worked intensive care and non-intensive care aerosol generating settings were at higher risk (HR 2.09, 95% CI 1.49-2.94). Although the absolute risk of admission was low overall, the notable proportion of admissions resulting in critical care or death have implications for the safety of healthcare workers and the sustainability of healthcare delivery.

Transmission of SARS-CoV-2 Infections in Households- Tennessee and Wisconsin, April-September 2020

From April 2020 to September 2020, household-contracted cases of SARS-CoV-2 were documented in Nashville, Tennessee and Marshfield, Wisconsin. From 191 index cases, there was a 53% (102/191) secondary infection rate among household members. Secondary infections were confirmed via CDC RT-PCR protocols. Approximately 75% of secondary infections were identified within 5 days of the index case’s symptom onset. Transmission rates were similar among adult index cases and paediatric index cases. Overall, household transmission of SARS-CoV-2 is common; therefore, strict self-isolation and mask precautions should be taken immediately upon a household member’s symptom onset or diagnosis.

SARS-CoV-2 seroprevalence and transmission risk factors among high-risk close contacts: a retrospective cohort study

This retrospective cohort study examined confirmed COVID-19 patients and their close contacts in Singapore to identify transmission risk factors and rates of asymptomatic cases. Beginning in January 2020, all close contacts – including household and non-household (social and work) contacts – of identified cases were traced, placed under mandatory home quarantine for 14 days, and monitored for symptoms three times per day by phone. All contacts were asked to complete a 70-point risk factor questionnaire. Close contacts with symptoms during the quarantine period were hospitalized and received SARS-CoV-2 PCR tests. Asymptomatic contacts, as well as symptomatic contacts without a positive PCR test, were asked to complete serology testing at least two weeks after their quarantine end date. Between January 23 and April 3, 2020, among 7770 close contacts of confirmed COVID-19 cases, there were 188 PCR-positive contacts and 7582 asymptomatic untested or PCR-negative contacts. Based on the stratification of the PCR-positive contacts, the secondary clinical attack rate was 5.9% (95% CI 4.9–7.1) among 1779 household contacts, 1.3% (95% CI 0.9–1.9) among 2231 work contacts, and 1.3% (95% CI 1.0–1.7) among 3508 social contacts. Among household contacts, sharing a bedroom and speaking for >30 minutes was associated with SARS-CoV-2 transmission from index case to contact. Among non-household contacts, exposure to multiple cases, speaking for >30 minutes, and sharing a vehicle were significant risk factors. Lastly, based on serology testing of asymptomatic or PCR-negative contacts, the study estimated that 62% (95% CI 55-69) of COVID-19
diagnoses were missed by only testing symptomatic contacts. Therefore, this suggests that all contacts of confirmed cases, especially household contacts, should be tested.

**UNIVERSAL SCREENING AND TESTING**

*Lessons from applied large-scale pooling of 133,816 SARS-CoV-2 RT-PCR tests* ¹¹

This study describes the validation and early implementation of sample pooling for SARS-CoV-2 detection. Authors monitored and employed adaptive 8-sample and 5-sample pooling of nasopharyngeal sample lysates for detections of SARS-CoV-2 during a 5-month period. From mid-April to mid-September, 2020, 133,816 samples were tested in 14,697 8-sample pools and 3,248 5-sample pools; 9.35% and 22.1% of the pools tested positive, respectively. The empirical efficiency (total number of tested samples divided by the number of actual RT-PCR reactions performed) was 4.587 for the 8-sample pools and 2.377 for the 5-sample pools. Authors conclude that the data analysis revealed pooling efficiency and sensitivity that exceed theoretical predictions, which resulted from non-random distribution of positive samples in pools. Adaptive pooling approaches can maximize resource-saving under fluctuating prevalence rates. These findings support pooling for efficient, large, high-quantity SARS-CoV-2 testing.

**ZOOONOSES**

*Susceptibility of Raccoon Dogs for Experimental SARS-CoV-2 Infection* ¹²

The goal of this study was to characterize viral shedding, transmission potential, susceptibility, serologic reactions, and pathologic lesions of raccoon dogs after experimental SARS-CoV-2 infection. Nine naive raccoon dogs were intranasally inoculated with $10^5$ 50% tissue culture infectious dose (TCID₅₀) SARS-CoV-2 2019_nCoV Muc-IMB-1. Direct transmission was tested 24 hours after inoculation with 3 naive animals. Three animals were lethargic four days after inoculation and none of the exposed or contact animals had fever, weight loss, or other signs of infection. Of the nine inoculated animals, six had viral shedding. Infection was detected in two of the three contact animals. Viral replication and tissue lesions were only found in the nasal conchae. The study demonstrates that raccoon dogs are susceptible to SARS-CoV-2 infection and can transmit the virus to direct in-contact animals. Authors suggest that additional surveillance is needed on susceptible animals such as raccoon dogs in China since the country is a large source of global fur production.
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. Canice Christian, Graham Hinchcliffe, Micaela Reyna, Alyssa Bercasio, Hannah Thomas, and Masih Babagoli contributed to these summaries. This work is volunteer based.

References:


