Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
implemented March 12 going to a total lockdown on March 15 with all travels suspended.

**Conclusion:** Following the detection of the first COVID-19 case, Albania acted swiftly to implement immediate social distancing and lockdown measures. Such drastic measures had a huge effect on COVID-19 control in the beginning. However, the trend of effective reproduction numbers show a plateau for almost the last two weeks of the month with no signs of further decline.

https://doi.org/10.1016/j.ijjid.2021.12.063

**PS04.08 (528)**

Comparison of different approaches in estimating the time-varying reproductive number for COVID-19

V.J. Jayaraj 1,2, D.W.Q. Chong 1,2, C.W. Ng 1, S. Rampal 1

1 Universiti Malaya, Centre for Epidemiology and Evidence-based Practice, Department of Social and Preventive Medicine, Faculty of Medicine, Kuala Lumpur, Malaysia
2 Ministry of Health Malaysia, Putrajaya, Malaysia

**Purpose:** The time-varying reproductive number (Rt) is an indicator of transmissibility that has utility in evaluating public health interventions and assessing transmission factors. However, the Rt may be biased by generation time misspecification, reporting delays, underestimation of cases, and day-to-day variations. We compared several methods of adjustments in developing an approach to estimating an unbiased Rt.

**Methods & Materials:** A meta-analysis of generations times was conducted to reduce misspecification. A probabilistic bias approach was compared to standardization by a test positivity of 5% in adjusting for underestimation. A Poisson deconvolution process was an incubation period of 5.2 days (95% CI: 4.9-5.5) and laboratory turnover times between 2-5- and 10-days was utilized to adjust for reporting delays. We compared smoothing (7- and 14-day moving averages), a generalized additive model (GAM), and a local regression (LOESS) model to adjust for day-to-day variation. The adjusted Rt was compared to a crude Rt by eyeballing, Mean Average Percentage Error (MAPE), and Mean Absolute Deviation (MAD). We estimated the Rt using Malaysian COVID-19 daily case data from 7 March 2020-20 June 2021 utilizing Cori et al.’s method.

**Results:** We estimated a pooled serial interval of 4.95 days (95% CI: 4.62-5.29). The Rt estimated using case counts adjusted for underestimation using standardization by test positivity (MAPE: 0.31; 95% CI: 0.30-0.49, MAD: 0.5; 95%CI: 0.5-0.54) were more volatile, exhibited larger peaks and wider confidence intervals, especially in periods of lower incidence, compared to the probabilistic bias approach (MAPE: 0.07; 95% CI: 0.06-0.07, MAD: 0.26; 95%CI: 0.26-0.28); GAM (MAPE: 1.85, 95% CI: 1.63-2.08) and LOESS (MAPE: 0.29, 95% CI: 0.29-0.29) models had smoothed out almost all variations in the Rt. Longer lab turnover periods created smoother Rt with larger peaks and resulted in greater volatility in the estimates.

**Conclusion:** Biases in the estimation of the Rt may critically change its interpretation for public health interventions. It is important to adjust for these biases and understand the underlying limitations of these estimations; primarily when utilized within the context of pandemic control.

https://doi.org/10.1016/j.ijjid.2021.12.064

**PS04.09 (549)**

Spatial Opinion Mining from COVID-19 Twitter Data

M.A. Syed 1, R. Decoupes 2, E. Arsevska 1, M. Roche 1, M. Teisseire 2

1 Citad, Montferrier-sur-Lez, France
2 Inrae - Center Occitanie-Montpellier, Montpellier, France

**Purpose:** In the first quarter of 2020, World Health Organization (WHO) declared COVID-19 as a public health emergency around the globe. Therefore, different users from all over the world shared their thoughts about COVID-19 on social media platforms i.e., Twitter, Facebook etc. So, it is important to analyze public opinions about COVID-19 from different regions over different period of time. To fulfill the spatial analysis issue, a previous work called H-TF-IDF (Hierarchy-based measure for tweet analysis) for term extraction from tweet data has been proposed. In this work, we focus on the sentiment analysis performed on terms selected by H-TF-IDF for spatial tweets groups to know local situations during the ongoing epidemic COVID-19 over different time frames.

**Methods & Materials:** The primary step is to extract terms from tweets using H-TF-IDF approach. Moreover, these terms are utilized in two ways i.e., 1) select tweets containing terms, 2) terms used as features for sentiment analysis. Thereafter, data preprocessing is performed to clean the text. Afterwards, Vectorization models i.e., bag-of-words (BOW) and term frequency-inverse document frequency (TF-IDF) are used to extract features with the help of n-gram techniques. These features are extracted to train the prediction models for sentiment analysis. Lastly, different statistical and machine learning models i.e., Logistic regression, support vector machine (SVM), etc. are applied to classify the spatial tweets groups. For preliminary results, experiments are conducted on H-TF-IDF tweets corpus having geo-coded spatial information for the period of January, 2020. These tweets are extracted from the dataset collected by E.Chen (https://github.com/echen102/COVID-19-TweetIDs) that focuses on the early beginning of the outbreak. A uniform experiment setup of train-test (80% and 20%) split scheme is used for each prediction model.

**Results:** The results illustrate that specific terms highlighted by H-TF-IDF provide useful information that would not have been identified without this spatial analysis. The classification results spatial location tweet groups into positive, negative and neutral by subjectivity and polarity measures.

**Conclusion:** The current work is applied on English language-based Twitter information. A following work is to incorporate other languages to perform sentiment analysis. Furthermore, BERT will be used to extend these features.

https://doi.org/10.1016/j.ijjid.2021.12.065

**PS04.10 (62)**

Longitudinal surveillance of Post-Acute Sequelae of SARS-CoV-2 among Long Beach City residents, April-December, 2020

K. Yomogida 1,2, S. Zhu 1,3, F. Rubino 1,4, W. Figueroa 1, N. Barin 1, E. Holman 1

1 City of Long Beach Department of Health and Human Services, Long Beach, United States
2 Center for Animal Disease Modeling and Surveillance, Davis, United States
3 UC Davis School of Veterinary Medicine, Pathology, Microbiology, & Immunology, Davis, United States

https://doi.org/10.1016/j.ijjid.2021.12.064
**Purpose:** There have been limited studies on the post-acute sequelae of SARS-CoV-2 (PASC) throughout the course of the disease and recovery. The purpose of this study was to identify the prevalence and associated factors of PASC in a diverse population to inform patients’ expectations and public health policy.

**Methods & Materials:** Confirmed Coronavirus Disease 2019 (COVID-19) surveillance data was obtained from the California Reportable Disease Information Exchange (CalRedIE) surveillance system between April 1, 2020 and December 10, 2020. Simple random sampling without replacement was used to select participants for the study. Interview questions, guided by the CalRedIE COVID-19 case investigation questionnaire, focused on tracking self-reported symptoms prior to diagnosis, at time of positive test result, one-month post-testing, two months post-testing, and on the date of the final interview.

**Results:** One third of participants reported PASC two months post-testing, most commonly reporting fatigue, anosmia, and dyspnea. Individuals forty years and older, female, Black/African American, and with asthma or obesity had the highest odds of developing PASC in our study population.

**Conclusion:** Age, gender, pre-existing conditions, and ethnicity/race were associated with developing PASC in a diverse sample of hospitalized and non-hospitalized participants. As the number of recovered COVID-19 patients increases, it is critical to understand the impacts of PASC and differential access to care and recovery among diverse populations in order to guide patient expectations and equitable public health policies.

https://doi.org/10.1016/j.ijid.2021.12.067