

Global Health Day

East Asian and the Pacific Surveillance of SARS-CoV-2 Wave Two

Jasmine Lin, Charles B. Moss, Robert Murphy, Michael G. Ison, Chad J. Achenbach, Danielle Resnick, Lauren Nadya Singh, Janine White, Michael J. Boctor, and James Francis Oehmke, Lori Ann Post

Background: The COVID-19 pandemic has had a profound global impact on governments, healthcare systems, economies, and populations around the world. Within the East Asia and Pacific region, some countries have mitigated the spread of the novel coronavirus effectively and largely avoided severe negative consequences, while others still struggle with containment. As the second wave reaches East Asia and the Pacific, it becomes more obvious that additional SARS-CoV-2 surveillance is needed to track recent shifts in the pandemic, rates of increase, and persistence. Objectives: The goal of this study is to provide advanced surveillance metrics for COVID-19 transmission that account for shifts in the pandemic, week over week, speed, acceleration, jerk and persistence, to better understand country risk for explosive growth and those who are managing the pandemic successfully. Existing surveillance coupled with our dynamic metrics of transmission will inform health policy to control the COVID-19 pandemic until an effective vaccine is developed. We provide novel indicators to measure the transmission of disease.

Methods: Using a longitudinal trend analysis study design, we extracted 330 days of COVID data from public health registries. We use an empirical difference equation to measure the daily number of cases in East Asia and the Pacific as a function of the prior number of cases, the level of testing, and weekly shift variables based on a dynamic panel model that was estimated using the generalized method of moments (GMM) approach by implementing the Arellano-Bond estimator in R.

Results: Based on standard surveillance metrics, Indonesia, Philippines, and Myanmar are concerning because they have the largest new caseloads at 4,301, 2,588, and 1,387 respectively. However, when looking at the acceleration of new COVID-19 infections, we find that French Polynesia, Malaysia, and Philippines have the rates at 3.17, .22, and .06 per 100,000. These three countries also rank highest in positive jerk rates at 15.45, .10 and .04 respectively.

Conclusions: Two of the most populous countries in East Asia and the Pacific, Indonesia and the Philippines have alarming infection rates and caseloads. The highest rates of speed, acceleration and positive upwards jerk belong to French Polynesia, Malaysia and the Philippines. Positive rates of speed, acceleration and upwards jerk are more likely to result in explosive growth. While all countries in East Asia and Pacific need to be cautious in regards to opening their countries because outbreaks are likely to occur in the second wave of COVID-19, the country of greatest concern remains the Philippines. Based

on standard and enhanced surveillance plus the fact they rank 4th in population, the Philippines has not gained control of the COVID-19 epidemic. Without extreme and rigid social distancing, quarantines, hygiene, and masking to reverse trends, the Philippines will remain on the global top 5 list of worst COVID-19 outbreaks resulting in high morbidity and mortality. The second wave will only exacerbate existing conditions and increase COVID-19 transmissions.

This research was presented as part of Northwestern University Institute for Global Health's Annual Global Health Day on Friday, December 4th, 2020.