

Abstract (600 word limits)

Background: The Great COVID-19 Shutdown aimed to eliminate or slow the spread of SARS-CoV-2, the virus that causes COVID-19. The United States has no national policy, leaving states to independently implement public health guidelines that are predicated on a sustained decline in COVID-19 cases. Operationalization of “sustained decline” varies by state and county. Existing models of COVID-19 transmission rely on parameters such as case estimates or R_0 and are dependent on intensive data collection efforts. Static statistical models do not capture all of the relevant dynamics required to measure sustained declines. Moreover, existing COVID-19 models use data that are subject to significant measurement error and contamination.

Objective: This study will generate novel metrics of speed, acceleration, jerk, and 7-day lag in the speed of COVID-19 transmission using state government tallies of SARS-CoV-2 infections, including state-level dynamics of SARS-CoV-2 infections. This study provides the prototype for a global surveillance system to inform public health practice, including novel standardized metrics of COVID-19 transmission, for use in combination with traditional surveillance tools.

Methods: Dynamic panel data models were estimated with the Arellano-Bond estimator using the generalized method of moments. This statistical technique allows for the control of a variety of deficiencies in the existing data. Tests of the validity of the model and statistical techniques were applied.

Results: The statistical approach was validated based on the regression results, which determined recent changes in the pattern of infection. During the weeks of August 17-23 and August 24-30, 2020, there were substantial regional differences in the evolution of the US pandemic. Census regions 1 and 2 were relatively quiet with a small but significant persistence effect that remained relatively unchanged from the prior 2 weeks. Census region 3 was sensitive to the number of tests administered, with a high constant rate of cases. A weekly special analysis showed that these results were driven by states with a high number of positive test reports from universities. Census region 4 had a high constant number of cases and a significantly increased persistence effect during the week of August 24-30. This change represents an increase in the transmission model R value for that week and is consistent with a re-emergence of the pandemic.

Conclusions: Reopening the United States comes with three certainties: (1) the “social” end of the pandemic and reopening are going to occur before the “medical” end even while the pandemic is growing. We need improved standardized surveillance techniques to inform leaders when it is safe to open sections of the country; (2) varying public health policies and guidelines unnecessarily result in varying degrees of transmission and outbreaks; and (3) even those states most successful in containing the pandemic continue to see a small but constant stream of new cases daily.

Biography (200 word limit)

Lori Ann Post, PhD is the Buehler Professor of Emergency Medicine and Medical Social Sciences at the Feinberg School of Medicine. She is the inaugural Director of the Buehler Center for Health Policy and Economics. She moved from Michigan State (Assistant Prof and Research Dean), Yale University (Associate Prof and Research Director, Research Section Chief), and now full professor and center director at Northwestern University. She did her dissertation (Applied Demography) indirectly estimating the invisible population of elderly women being abused and exploited, funded by CDC. She was funded by the Center for Medicare to develop a background check system to vet the healthcare workforce for persons in long-term care. The state of Michigan is the only pilot state still using the system. Dr. Post wrote the legislation for “Best Practices in background checks for the Affordable Healthcare Act which appropriated \$3,000,000 per state and territory to develop a system similar to Michigan. Dr. Post has also been funded by Medicaid to derive estimates of various types of abuse and disabilities. Dr. Post worked with Yale New Haven Health Care System to develop an App to screen for disabilities and to provide healthcare providers with a prognostic score of death, admit, and return to the ED at 30 days. This project is listed on AHRQ’s website as one of their successful studies. Dr. Post has been working in information technology or Informatics and violence prevention/intervention for the past 20 years including the first sexual assault surveillance system and a community based violence intervention - - both funded by CDC. Dr. Post is a seasoned researcher who utilizes unique mixed methods studies to address complex problems. Furthermore, she works on a line of research to mobilize Public Will to align with Political Will to reduce violence.

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