Institutional Origins of COVID-19 Public Health Protective Policy Response (PPI) Data Set v. 1.2

Olga Shvetsova,* Department of Political Science, Binghamton University, P.O. Box 6000, Binghamton, NY 13902, USA; shvetso@binghamton.edu
Abdul Basit Adeel, Department of Political Science, Binghamton University, P.O. Box 6000, Binghamton, NY 13902; aadeel1@binghamton.edu
Michael Catalano, Department of Political Science, Binghamton University, P.O. Box 6000, Binghamton, NY 13902; mcatala4@binghamton.edu
Olivia Catalano, 3215 Stack Avenue, Endicott, NY 13760, olivia.catalano15@gmail.com
Frank Giannelli, School of Health Professions, Rutgers, The State University of New Jersey, 675 Hoes Lane West, 6th Floor, Piscataway, NJ 08854; giannefr@sph.rutgers.edu
Ezgi Muftuoglu, Department of Political Science, Binghamton University, P.O. Box 6000, Binghamton, NY 13902, emuftuo1@binghamton.edu
Tara Riggs, Department of Political Science, Binghamton University, P.O. Box 6000, Binghamton, NY 13902, triggs1@binghamton.edu
Mehmet Halit Sezgin, Department of Political Science, Binghamton University, P.O. Box 6000, Binghamton, NY 13902, halitsezgin@gmail.com
Naveed Tahir, Department of Electrical Engineering and Computer Science, Syracuse University, 111 College Place, Syracuse NY 13210 ntahir@syr.edu
Julie VanDusky-Allen, School of Public Service, Boise State University, 1910 University Dr., Boise, ID 83725, julievduskyallen@boisestate.edu
Tianyi Zhao, Department of Political Science, Binghamton University, P.O. Box 6000, Binghamton, NY 13902, tzhao19@binghamton.edu
Andrei Zhirnov, Q-Step Centre & Department of Politics, University of Exeter, Clayden, Streatham Rise, Exeter, EX4 4PE, UK; A.Zhirnov@exeter.ac.uk

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Abstract:

This is an original dataset of stringency of public health policy measures that were adopted in response to COVID-19 worldwide by governments at different levels January 24 and April 30 2020.

The national file includes daily national level aggregates for 64 countries. The regional file includes daily sub-national level aggregates for Canada and the USA.

To measure COVID-19 mitigation policy responses, we gathered data on policies that national and subnational policymakers adopted within fifteen public health categories: state of emergency, self-isolation and quarantine, border closures, limits on social gatherings, school closings, closure of entertainment venues, closure of restaurants, closure of non-essential businesses, closure of government offices, work from home requirements, lockdowns and curfews, public transportation closures, and mandatory wearing of PPE. We identify and code national and subnational public health policies for each subnational unit in 64 countries (subnational aggregates are presently published of USA and Canada only), including countries in North America, Central America, South America, Europe, the Middle East, and Asia. We rely primarily on government resources, press releases, and news sources, dating policies based on first announcement. Note that between and within the policy categories, there is variation on stringency, with some policy adoptions being more stringent than others (i.e. self-isolation versus lockdowns, partial school closings versus full school closings). To this end, we weighed more stringent policies in each category in the index more heavily.

Based on coded public health policy responses to COVID-19, we calculate the Public Health Protective Policy Indices (PPI): Regional PPI for each subnational unit on each day; National PPI for a country on each day, based on national level policies; and Total PPI for each subnational unit on each day. The Total PPI reflects the strictest between the national and subnational policies adopted within each category for that unit for that day. The indices are scaled to range between 0 and 1. The Average Total PPI for each country-day is computed by weighing the different units’ Total PPI values by the units’ population shares. The indices apply solely to the measurable subnational and national public-health COVID-19 mitigation policy responses.
Validation:
Comparison of PPI with IRT-based Index

With scores for each category of policies as ordinal responses, we applied the ordIRT function\(^1\) (Imai et al. 2016, p. 640). The model underlying this function is

\[
Pr(y_{ij} = 0) = \Phi(-\tau_j \alpha_j^* - \tau_j x_i \beta_j)
Pr(y_{ij} = 1) = \Phi(-\tau_j \alpha_j^* + \tau_j x_i \beta_j) - \Phi(-\tau_j \alpha_j^* - \tau_j x_i \beta_j)
Pr(y_{ij} = 2) = 1 - \Phi(-\tau_j \alpha_j^* + \tau_j - \tau_j x_i \beta_j)
\]

where \(y_{ij}\) is the level of response of a government on a particular date \((i)\) in a given category \((j)\), \(\beta_j\) reflects the discriminating power of the item, and \(\alpha_j^*\) and \(\tau_j\) are auxiliary parameters (jointly fixing the thresholds defining the observed categories). \(x_i\) is the aggressiveness of the policies. The procedure estimates \(x_i\) as well as \(\beta_j\), \(\alpha_j^*\), and \(\tau_j\). We treat the estimates of \(x_i\) as the estimates of the stringency of public health measures for the purpose of comparison with the PPI.

The resulting subnational version of the index is correlated with the subnational PPI at 0.987, while the resulting overall score is correlated with the overall PPI at 0.990.

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Comparison of the PPI index with the OxCGRT index

The OxCGRT project at Oxford\(^2\) (Hale et al. 2020) maintains an index of the stringency of the government response to COVID-19. This index is similar to our index in that it is aggregates information about policies along various dimension of non-medical public health response. The total number of policy categories used in the computation of OxCGRT’s stringency index is 9, and 7 of them are similar to the ones used in the computation of PPI. Similar dimensions include:

- C1_School closing
- C2_Workplace closing
- C4_Restrictions on gatherings
- C5_Close public transport
- C6_Stay at home requirements
- C7_Restrictions on internal movement
- C8_International travel controls

PPI analogue of “C3_Cancel public events” is “closing of public venues.” PPI additionally accounts for the closure of non-essential businesses, the PPE requirements (such as masks) and the required self-isolation and quarantine for the individuals travelling from COVID hotspots or known to have been exposed.

In our global sample, overall PPI is correlated with OxCGRT index at 0.901.

Publications using PPI data as of September 28 2020:


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Julie VanDusky Allen, Olga Shvetsova, and Andrei Zhirnov, COVID-19 Policy Response in Argentina, Brazil, and Mexico: Three Different National-Subnational Approaches July 2 2020, Duck of Minerva


5. https://orb.binghamton.edu/working_paper_series/5/.