Tuesday, April 30, 2024

Access the code, data, and analysis at https://github.com/andrewheiss/mountainous-mackerel

Online appendix for "Pandemic Pass? Treaty Derogations and Human Rights Practices During COVID-19"

(Research note)

Suparna Chaudhry
Lewis and Clark College
schaudhry@lclark.edu

Audrey L. Comstock
Arizona State University
audrey.comstock@asu.edu

Andrew Heiss
Georgia State University
aheiss@gsu.edu

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Modeling approach

We use Stan 2.34.1 (Stan Development Team 2023) through R 4.3.3 (R Core Team 2023) and {brms} 2.21.0 (Bürkner 2017) to estimate our models. We generate 4 MCMC chains for each model with 2,000 iterations in each chain, 1,000 of which are used for warmup. All chains converge; we assess convergence with visual inspection.

Complete results from all the models, along with posterior predictive checks, goodness-of-fit measures, and prediction diagnostics are all available at a companion statistical analysis compendium at https://doi.org/10.17605/OSF.IO/ANONYMIZED-FOR-NOW.

Priors

We follow the suggestion of Gelman et al. (2008) and use weakly informative priors for our logistic and ordered logistic regression models. For consistency with prior specification, and for computation efficiency, we mean-center all nonbinary variables so that parameter estimates represent changes from the mean. We use two general priors (see Figure 1):

- For all β terms, we use a Student t distribution with a mean of 0 and a standard deviation of 3. This keeps most parameter estimates around −5 to 5, with thicker tails that allow for some possibility of extreme values.
- For σ terms related to the variance or standard deviation of parameter distributions, which must be positive, we use a half Cauchy distribution, centered at 0 with a γ of 1

These priors give more weight to realistic areas of parameter values and downweight values in unrealistic spaces. For instance, since logit-scale coefficient values greater than 4 or 5 are highly unlikely, our Student t prior puts more weight on smaller values. Additionally, weakly informative priors allow reasonable and considerable uncertainty in possible parameter estimates.

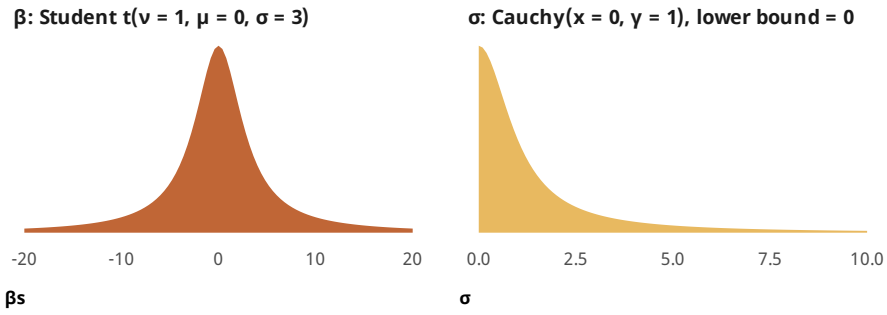

Figure A 1: Density plots of prior distributions for model parameters

Model definitions

H_1: Logistic regression

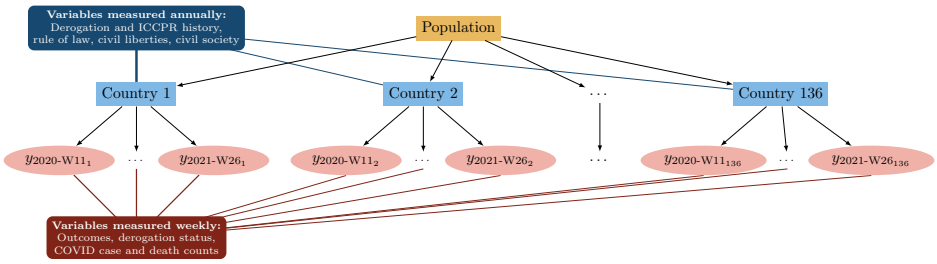

Figure A 2: Hierarchy of country-week data, showing location and frequency of measured variables

Binary outcome i across week t within each country j

$$\text{Outcome}_{it_j} \sim \text{Bernoulli}(\pi_{it_j})$$

Distribution parameters

$$\begin{aligned}
\pi_{it_j} = (\beta_0 + b_{0_j}) + \beta_1 &\text{Derogation in effect}_{it} + \\
\beta_2 &\text{ New cases}_{it} + \beta_3 \text{ Cumulative cases}_{it} + \\
\beta_4 &\text{ New deaths}_{it} + \beta_5 \text{ Cumulative deaths}_{it} + \\
\beta_6 &\text{ Past ICCPR derogation}_{it} + \beta_7 \text{ Past ICCPR action}_{it} + \\
\beta_8 &\text{ Rule of law index}_{it} + \beta_9 \text{ Civil liberties index}_{it} + \\
\beta_{10} &\text{ Core civil society index}_{it} + \beta_{11} \text{ Week number}_{it} \\
b_{0_j} &\sim \mathcal{N}(0, \sigma_0)
\end{aligned}$$

Priors

$$\begin{aligned}
\beta_{0\ldots11} &\sim \text{Student t}(\nu = 1, \mu = 0, \sigma = 3) \\
\sigma_0 &\sim \text{Cauchy}(x = 0, \gamma = 1), \text{ lower bound} = 0
\end{aligned}$$

The actual R code for these models is included in the replication code at https://doi.org/10.17605/OSF.IO/ANONYMIZED-FOR-NOW This is a simplified representation of the {brms} (Bürkner 2017) model code:

```
# H1: Logistic regression for binary outcomes
brm(
  bf(outcome ~ derogation_ineffect +
      new_cases_z + cumulative_cases_z +
      new_deaths_z + cumulative_deaths_z +
      prior_iccpr_derogations + prior_iccpr_other_action +
      v2x_rule + v2x_civlib + v2xcs_ccsi +
      year_week_num + (1 | country_name)),
  family = bernoulli(),
  prior = c(
```

```
    prior(student_t(1, 0, 3), class = Intercept),
    prior(student_t(1, 0, 3), class = b),
    prior(cauchy(0, 1), class = sd, lb = 0)),
  ...
)
```

H_2: Ordered logistic regression

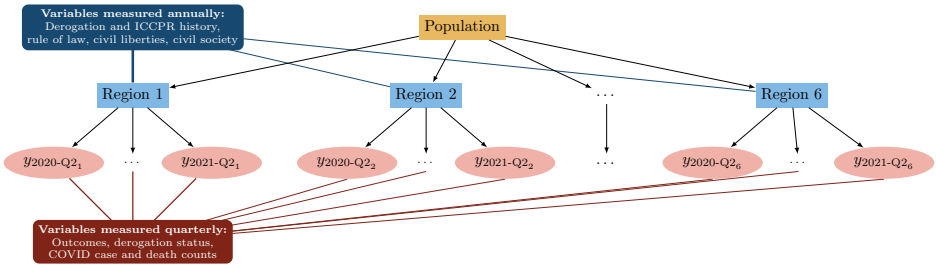

Figure A 3: Hierarchy of region-quarter data, showing location and frequency of measured variables

Model of outcome level i across quarter t within each region j

$$\text{Outcome}_{it_j} \sim \text{Ordered logit}(\phi_{it_j}, \alpha_k)$$

Models for distribution parameters

$$\begin{aligned}
\phi_{it_j} = (\beta_0 + b_{0_j}) + \beta_1 &\text{Derogation in effect}_{it} + \\
\beta_2 &\text{ New cases}_{it} + \beta_3 \text{ Cumulative cases}_{it} + \\
\beta_4 &\text{ New deaths}_{it} + \beta_5 \text{ Cumulative deaths}_{it} + \\
\beta_6 &\text{ Past ICCPR derogation}_{it} + \beta_7 \text{ Past ICCPR action}_{it} + \\
\beta_8 &\text{ Rule of law index}_{it} + \beta_9 \text{ Civil liberties index}_{it} + \\
\beta_{10} &\text{ Core civil society index}_{it} + \beta_{11} \text{ Quarter number}_{it} \\
b_{0_j} &\sim \mathcal{N}(0, \sigma_0)
\end{aligned}$$

Priors

$$\begin{aligned}
\beta_{0\ldots11} &\sim \text{Student t}(\nu = 1, \mu = 0, \sigma = 3) \\
\sigma_0 &\sim \text{Cauchy}(x = 0, \gamma = 1), \text{ lower bound} = 0 \\
\alpha_k &\sim \mathcal{N}(0, 1)
\end{aligned}$$

The actual R code for these models is included in the replication code at https://doi.org/10.17605/OSF.IO/ANONYMIZED-FOR-NOW This is a simplified representation of the {brms} (Bürkner 2017) model code:

```
# H2: Ordinal logistic regression for ordered outcomes
brm(
  bf(outcome ~ derogation_ineffect +
      new_cases_z + cumulative_cases_z +
```

```
      new_deaths_z + cumulative_deaths_z +
      prior_iccpr_derogations + prior_iccpr_other_action +
      v2x_rule + v2x_civlib + v2xcs_ccsi +
      year_quarter_num + (1 | who_region)),
  family = cumulative(),
  prior = c(
    prior(student_t(1, 0, 3), class = Intercept),
    prior(student_t(1, 0, 3), class = b),
    prior(cauchy(0, 1), class = sd, lb = 0)),
  ...
)
```

Table A 1: Summary of predicted probabilities and minimum and maximum contrasts between derogating and non-derogating countries for emergency policy models

	Predicted probabilities		Smallest difference			Largest difference		
Derogation	March 2020	June 2021	Week	Δ	p > 0	Week	Δ	p > 0
Cancel Public Events								
No	0.98 [0.94–0.99]	0.93 [0.81–0.97]	2020-03-09	0.02 [0.01–0.05]	1	2021-06-28	0.07 [0.03–0.18]	1
Yes	1.00 [0.99–1.00]	1.00 [0.98–1.00]						
Gathering Restrictions								
No	0.91 [0.80–0.97]	0.90 [0.78–0.96]	2020-03-09	0.09 [0.03–0.20]	1	2021-06-28	0.10 [0.04–0.22]	1
Yes	1.00 [1.00–1.00]	1.00 [1.00–1.00]						
Close Public Transit								
No	0.50 [0.33–0.66]	0.33 [0.20–0.49]	2020-03-09	0.23 [0.15–0.32]	1	2021-01-18	0.25 [0.16–0.34]	1
Yes	0.74 [0.56–0.86]	0.58 [0.39–0.75]						
Movement								
No	0.66 [0.50–0.80]	0.18 [0.10–0.30]	2020-03-09	0.25 [0.15–0.36]	1	2021-02-22	0.39 [0.28–0.50]	1
Yes	0.92 [0.83–0.96]	0.55 [0.35–0.75]						
International Travel								
No	0.99 [0.92–1.00]	1.00 [1.00–1.00]	2021-06-28	0.00 [0.00–0.00]	1	2020-03-09	0.01 [0.00–0.08]	1
Yes	1.00 [1.00–1.00]	1.00 [1.00–1.00]						

Table A 2: Complete results from models showing relationship between derogations and emergency policies (H_1)

	Cancel Public Events	Gathering Restrictions	Close Public Transit	Movement	International Travel
Derogation in effect	3.3 [1.3, 5.9]	10.5 [2.5, 46.5]	1.05 [0.65, 1.43]	1.7 [1.2, 2.2]	7.43 [0.27, 40.76]
New cases (standardized)	2.3 [-1.0, 5.4]	8.5 [5.7, 11.3]	-0.67 [-0.88, -0.48]	0.77 [0.33, 1.27]	6.59 [-0.51, 17.01]
Cumulative cases (standardized)	3.4 [1.3, 5.7]	4.7 [3.0, 6.9]	-0.381 [-0.810, 0.035]	-0.20 [-0.59, 0.21]	1.5 [-5.3, 14.5]
New deaths (standardized)	8.1 [4.9, 11.4]	2.4 [1.1, 3.9]	1.23 [0.95, 1.51]	0.74 [0.37, 1.11]	-1.63 [-3.22, -0.12]
Cumulative deaths (standardized)	-0.917 [-1.892, 0.062]	-2.7 [-3.6, -1.9]	0.71 [0.27, 1.14]	0.20 [-0.21, 0.62]	6.03 [0.98, 11.96]
Past ICCPR derogation	0.41 [-0.69, 1.64]	-1.31 [-2.43, -0.28]	0.083 [-0.589, 0.821]	0.14 [-0.71, 0.93]	-1.26 [-3.54, 0.99]
Past ICCPR action	-0.091 [-1.179, 1.184]	0.13 [-0.87, 1.14]	-0.22 [-0.99, 0.46]	0.078 [-0.642, 0.866]	0.32 [-1.64, 2.53]
Rule of law	3.2 [1.3, 5.3]	0.70 [-0.97, 2.58]	-0.73 [-2.03, 0.57]	-0.78 [-2.07, 0.62]	-0.11 [-3.93, 3.27]
Civil liberties	-4.13 [-7.86, -0.66]	1.3 [-1.7, 4.1]	1.0 [-1.2, 3.4]	-0.57 [-2.65, 1.86]	0.96 [-4.23, 7.68]
Core civil society index	0.35 [-1.95, 2.86]	-0.085 [-2.287, 1.845]	-0.84 [-2.61, 0.76]	-0.64 [-2.15, 1.06]	-1.8 [-7.2, 2.5]
Constant	8.1 [6.6, 9.5]	4.9 [3.7, 6.0]	1.29 [0.46, 2.09]	3.5 [2.7, 4.4]	10.8 [7.2, 15.5]
Year-week	-0.021 [-0.026, -0.016]	-0.0030 [-0.0082, 0.0020]	-0.0103 [-0.0134, -0.0075]	-0.032 [-0.035, -0.029]	0.050 [0.033, 0.069]
Country random effects σ	2.5 [2.0, 2.9]	2.3 [2.0, 2.8]	1.8 [1.6, 2.0]	1.9 [1.6, 2.2]	3.9 [2.7, 5.6]
N	9453	9522	8832	9246	9591
R^2 (total)	0.31	0.41	0.36	0.40	0.32
R^2 (marginal)	0.01	0.03	0.07	0.12	0.00

Note: Estimates are median posterior log odds from ordered logistic and binary logistic regression models; 95% credible intervals (highest density posterior interval, or HDPI) in brackets. Total R^2 considers the variance of both population and group effects; marginal R^2 only takes population effects into account.

Table A 3: Summary of predicted probabilities and minimum and maximum contrasts between derogating and non-derogating countries for human rights models

		Predicted probabilities		Smallest difference			Largest difference		
Derogation	Level	2020-Q2	2021-Q2	Week	Δ	p > 0	Week	Δ	p > 0
Discriminatory Policy									
No	None	0.87 [0.79–0.93]	0.94 [0.90–0.97]	2021-Q2	0.02 [-0.04–0.06]	0.8170	2020-Q2	0.05 [-0.07–0.13]	0.8170
Yes	None	0.92 [0.79–0.98]	0.96 [0.89–0.99]						
No	Minor	0.06 [0.04–0.10]	0.03 [0.02–0.05]	2020-Q2	-0.02 [-0.06–0.03]	0.1830	2021-Q2	-0.01 [-0.03–0.02]	0.1830
Yes	Minor	0.04 [0.01–0.10]	0.02 [0.00–0.06]						
No	Moderate	0.01 [0.01–0.02]	0.01 [0.00–0.01]	2020-Q2	0.00 [-0.01–0.01]	0.1830	2021-Q2	0.00 [-0.01–0.00]	0.1830
Yes	Moderate	0.01 [0.00–0.02]	0.00 [0.00–0.01]						
No	Major	0.05 [0.03–0.10]	0.02 [0.01–0.05]	2020-Q2	-0.02 [-0.06–0.03]	0.1830	2021-Q2	-0.01 [-0.03–0.02]	0.1830
Yes	Major	0.03 [0.01–0.10]	0.01 [0.00–0.05]						
Non-Derogable Rights									
No	—	0.03 [0.01–0.06]	0.02 [0.01–0.04]	2021-Q2	0.00 [-0.02–0.04]	0.5443	2020-Q2	0.00 [-0.03–0.06]	0.5443
Yes	—	0.03 [0.01–0.10]	0.02 [0.00–0.07]						
No Time Limit Measures									
No	None	0.66 [0.54–0.76]	0.61 [0.49–0.72]	2020-Q2	0.22 [0.11–0.33]	0.9995	2021-Q2	0.25 [0.12–0.36]	0.9995

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Table A 3: Summary of predicted probabilities and minimum and maximum contrasts between derogating and non-derogating countries for human rights models (Continued)

		Predicted probabilities		Smallest difference			Largest difference		
Derogation	Level	2020-Q2	2021-Q2	Week	Δ	p > 0	Week	Δ	p > 0
Yes	None	0.89 [0.76–0.95]	0.86 [0.71–0.95]						
No	Minor	0.02 [0.01–0.03]	0.02 [0.01–0.03]	2020-Q2	-0.01 [-0.02–0.00]	0.0005	2021-Q2	-0.01 [-0.02–0.00]	0.0005
Yes	Minor	0.01 [0.00–0.02]	0.01 [0.00–0.02]						
No	Moderate	0.32 [0.23–0.44]	0.37 [0.27–0.49]	2021-Q2	-0.24 [-0.35–-0.12]	0.0005	2020-Q2	-0.21 [-0.32–-0.11]	0.0005
Yes	Moderate	0.11 [0.04–0.22]	0.13 [0.05–0.28]						
Abusive Enforcement									
No	None	0.66 [0.55–0.75]	0.92 [0.88–0.95]	2020-Q2	-0.05 [-0.18–0.07]	0.2010	2021-Q2	-0.02 [-0.08–0.02]	0.2010
Yes	None	0.60 [0.44–0.75]	0.90 [0.81–0.95]						
No	Minor	0.19 [0.14–0.25]	0.05 [0.03–0.08]	2021-Q2	0.01 [-0.01–0.05]	0.7990	2020-Q2	0.02 [-0.03–0.07]	0.7990
Yes	Minor	0.21 [0.14–0.27]	0.06 [0.03–0.11]						
No	Moderate	0.11 [0.07–0.16]	0.02 [0.01–0.04]	2021-Q2	0.01 [-0.01–0.02]	0.7990	2020-Q2	0.02 [-0.03–0.08]	0.7990
Yes	Moderate	0.13 [0.08–0.22]	0.03 [0.01–0.05]						
No	Major	0.04 [0.02–0.06]	0.01 [0.00–0.01]	2021-Q2	0.00 [0.00–0.01]	0.7990	2020-Q2	0.01 [-0.01–0.04]	0.7990

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Table A 3: Summary of predicted probabilities and minimum and maximum contrasts between derogating and non-derogating countries for human rights models (Continued)

		Predicted probabilities		Smallest difference			Largest difference		
Derogation	Level	2020-Q2	2021-Q2	Week	Δ	p > 0	Week	Δ	p > 0
Yes	Major	0.05 [0.02–0.09]	0.01 [0.00–0.02]						

Table A 4: Complete results from models showing relationship between derogations and human rights (H_2)

	Discriminatory Policy	Non-Derogable Rights	No Time Limit Measures	Abusive Enforcement
Derogation in effect	-0.52	0.075	-1.39	0.22
	[-1.70, 0.57]	[-1.210, 1.242]	[-2.25, -0.59]	[-0.31, 0.76]
New cases (standardized)	0.26	0.06	-0.11	0.019
	[-0.56, 1.04]	[-1.52, 1.61]	[-0.95, 0.68]	[-0.550, 0.599]
Cumulative cases (standardized)	-0.11	-0.13	-0.5	0.18
	[-1.10, 0.88]	[-2.14, 1.75]	[-1.5, 0.4]	[-0.59, 0.92]
New deaths (standardized)	-0.27	-0.053	0.079	0.22
	[-1.12, 0.58]	[-1.335, 1.088]	[-0.535, 0.663]	[-0.35, 0.78]
Cumulative deaths (standardized)	0.10	-0.41	0.28	-0.29
	[-0.96, 1.02]	[-2.11, 0.95]	[-0.48, 0.98]	[-1.03, 0.38]
Past ICCPR derogation	0.96	0.36	0.13	0.453
	[0.41, 1.51]	[-0.38, 1.10]	[-0.34, 0.57]	[0.042, 0.840]
Past ICCPR action	0.26	1.40	-0.52	0.033
	[-0.26, 0.75]	[0.78, 2.00]	[-0.98, -0.12]	[-0.359, 0.410]
Rule of law	1.06	0.86	0.70	-0.746
	[-0.27, 2.44]	[-0.86, 2.56]	[-0.26, 1.65]	[-1.653, 0.099]
Civil liberties	1.2	-3.88	-1.36	0.25
	[-1.4, 3.7]	[-7.17, -0.61]	[-3.37, 0.54]	[-1.50, 2.02]
Core civil society index	-2.23	0.58	-0.31	-0.31
	[-4.01, -0.72]	[-1.63, 2.78]	[-1.61, 1.10]	[-1.48, 1.01]
Constant		-1.35		
		[-2.57, -0.19]		
Cut 1	1.30		0.55	-0.712
	[-0.23, 2.71]		[-0.57, 1.49]	[-1.513, 0.049]
Cut 2	2.04		0.63	0.38
	[0.52, 3.47]		[-0.51, 1.56]	[-0.42, 1.12]
Cut 3	2.25			1.9
	[0.81, 3.76]			[1.1, 2.7]
Region random effects σ	1.27	0.68	0.85	0.56
	[0.61, 2.54]	[0.16, 1.50]	[0.32, 1.78]	[0.23, 1.16]
N	834	834	834	834
R^2 (total)	0.15	0.11	0.07	0.15
R^2 (marginal)	0.08	0.08	0.04	0.10

Note: Estimates are median posterior log odds from ordered logistic and binary logistic regression models; 95% credible intervals (highest density posterior interval, or HDPI) in brackets. Total R^2 considers the variance of both population and group effects; marginal R^2 only takes population effects into account.

Table A 5: WHO regions

AFRO: Regional Office for Africa
Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cape Verde, Cameroon, Central African Republic, Chad, Comoros, Congo - Brazzaville, Côte d'Ivoire, Congo - Kinshasa, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, St. Helena, São Tomé & Príncipe, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Togo, Uganda, Tanzania, Zambia, and Zimbabwe
AMRO: Regional Office for the Americas
Anguilla, Antigua & Barbuda, Argentina, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, British Virgin Islands, Canada, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Curaçao, Dominica, Dominican Republic, Ecuador, El Salvador, French Guiana, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Barthélemy, St. Kitts & Nevis, St. Lucia, Saint Martin (French part), St. Vincent & Grenadines, Sint Maarten, Suriname, Trinidad & Tobago, Turks & Caicos Islands, United States, Uruguay, and Venezuela
EMRO: Regional Office for the Eastern Mediterranean
Afghanistan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Palestinian Territories, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen
EURO: Regional Office for Europe
Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kosovo, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Moldova, Romania, Russia, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, United Kingdom, Türkiye, Turkmenistan, Ukraine, and Uzbekistan
SEARO: Regional Office for South-East Asia
Bangladesh, Bhutan, North Korea, India, Indonesia, Maldives, Myanmar (Burma), Nepal, Sri Lanka, Thailand, and Timor-Leste
WPRO: Regional Office for the Western Pacific
American Samoa, Australia, Brunei, Cambodia, China, Cook Islands, Fiji, French Polynesia, Japan, Kiribati, Laos, Malaysia, Marshall Islands, Micronesia (Federated States of), Mongolia, Nauru, New Zealand, Palau, Papua New Guinea, Philippines, South Korea, Samoa, Singapore, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Vietnam

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