Appendix

Compliance with the Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER)

CHECKLIST ITEM	DESCRIPTION OF COMPLIANCE
Objectives and funding	
1. Define the indicator(s), populations (including age, sex, and geographic entities), and time period(s) for which estimates were made.	• Manuscript: Methods (Data inputs [Inclusion and exclusion criteria])
2. List the funding sources for the work.	• Manuscript: Summary (Funding)
Data inputs	
For all data inputs from multiple sources that are synthesised as part of the study:	
3. Describe how the data were identified and how the data were accessed.	• Manuscript: Methods (Data inputs [Identifying and accessing suicide data])
4. Specify the inclusion and exclusion criteria. Identify all ad-hoc exclusions.	• Manuscript: Methods (Data inputs [Inclusion and exclusion criteria])
5. Provide information about all included data sources and their main characteristics. For each data source used, report reference information or contact name/institution, population represented, data collection method, year(s) of data collection, sex and age range, diagnostic criteria or measurement method, and sample size, as relevant.	• Manuscript: Table 1
6. Identify and describe any categories of input data that have potentially important biases (e.g., based on characteristics listed in item 5).	• Manuscript: Table 1; Results; Discussion (Strengths and limitations)
For data inputs that contribute to the analysis but were not synthesised as part of the study:	
7. Describe and give sources for any other data inputs.	• Not applicable.
For all data inputs:	
8. Provide all data inputs in a file format from which data can be efficiently extracted (e.g., a spreadsheet rather than a PDF), including all relevant meta-data listed in item 5. For any data inputs that cannot be shared because of ethical or legal reasons, such as third-party ownership, provide a contact name or the name of the institution that retains the right to the data.	• Supplementary appendices: Appendix 5
Data analysis	
9. Provide a conceptual overview of the data analysis method. A diagram may be helpful.	• Manuscript: Methods (Data analysis) • Supplementary appendices: Appendices 2 and 3
10. Provide a detailed description of all steps of the analysis, including mathematical formulae. This description should cover, as relevant, data cleaning, data pre-processing, data adjustments and weighting of data sources, and mathematical or statistical model(s).	• Manuscript: Methods (Data analysis) • Supplementary appendices: Appendices 2 and 3

CHECKLIST ITEM	DESCRIPTION OF COMPLIANCE
11. Describe how candidate models were evaluated and how the final model(s) were selected.	• Supplementary appendices: Appendices 2 and 3
12. Provide the results of an evaluation of model performance, if done, as well as the results of any relevant sensitivity analysis.	• Supplementary appendices: Appendices 2 and 3
13. Describe methods of calculating uncertainty of the estimates. State which sources of uncertainty were, and were not, accounted for in the uncertainty analysis.	• Manuscript: Methods (Data analysis) • Supplementary appendices: Appendices 2 and 3
14. State how analytical or statistical source code used to generate estimates can be accessed.	• Supplementary appendices: Appendix 4
Results and discussion	
15. Provide published estimates in a file format from which data can be efficiently extracted.	• Supplementary appendices: Appendix 5
16. Report a quantitative measure of the uncertainty of the estimates (e.g., uncertainty intervals).	• Manuscript: Figures 2, 3 and 4
17. Interpret results in light of existing evidence. If updating a previous set of estimates, describe the reasons for changes in estimates.	• Manuscript: Discussion (Interpreting the findings)
18. Discuss limitations of the estimates. Include a discussion of any modelling assumptions or data limitations that affect interpretation of the estimates.	• Manuscript: Discussion (Strengths and limitations) • Supplementary appendices: Appendices 2 and 3

Data modelling strategy

Our modelling strategy was to identify the best fitting model of suicide trends pre-COVID from the available data for each country or area-within-country. Ideally, the models would have allowed for non-linear time trends and seasonality. However, in some cases, this was not possible because of limited pre-COVID data (typically only from January 2019 onwards) and/or because the number of suicides per month was low. In addition, we were aware that there might be some countries or areas-within-countries where a non-linear model for time trends offered no improvement over a model fitting a linear trend for time. The process of identifying a model for each of the 35 countries or areas-within-countries was as follows:

1. We first fit a model to the pre-COVID data that fit a non-linear trend for time and predictors for seasonality. We identified the best fitting non-linear time trend by fitting a series of fractional polynomials to the data. We accounted for seasonality using Fourier terms – pairs of sine and cosine variables that allow for oscillations over a 12-month period of a variety of different shapes. Fractional polynomials differ from regular polynomials in that they allow a much larger range of curve shapes to be fit to the data. This is because regular polynomials only allow cubic and higher order terms and therefore can produce biologically implausible shapes. Fractional polynomials do not have this problem because they allow logarithms, negative and non-negative powers and powers to be repeated, thus giving much greater flexibility and opportunity for better fit to the data than cubic and quadratic powers. Using standard Stata software, all possible fractional polynomial power combinations (44 different models) were fit to each country or area-within-country's data to select the best fitting fractional polynomial model, adjusting for seasonality. The best fitting time trend model was chosen on the basis of the deviance statistic (twice the negative log-likelihood value) which was compared to competing models using the likelihood-ratio test. The software also allowed direct comparison to a model with a linear time trend. Therefore, if the best fitting fractional polynomial model offered significant improvement over an equivalent model with a linear time trend, then the fractional polynomial model was selected.

2. If the best fitting fractional polynomial model from the previous step was not significantly better than the linear model, then we instead selected the linear model. Note that this model still included seasonality terms.

3. Having estimated a model for each country or area-within-country, we used the model to plot the expected number of suicides over time. This included the pre-COVID period, on which the model was based, and the COVID period (March to July 2020 in the primary analysis). We visually compared the

expected values to the observed values over these two periods, noting any countries or areas-within-countries where there was a large discrepancy between the model's estimated values and those that were observed. We paid particular attention to the fit during the COVID period.

4. In some countries or areas-within-countries we observed a poor fit to the data. This occurred for all countries or areas-within-countries that only had data from January 2019 onwards and in areas where the number of suicides per month was low. In these cases, we then fit a simpler model to the pre-COVID data – one that only allowed for a linear time trend (i.e., excluding the seasonality terms). We again plotted the expected values over time and compared this to the observed values and observed no evidence of lack of fit.

Model results

Table A3.1 shows the number of countries and areas-within countries that were fit to each model in the primary analysis.

Table A3.1: Summary of models for the primary analysis

Model	**Number of countries or areas-within-counties**
Predictors for non-linear time trends and seasonality	10
Predictors for linear time trends and seasonality	15
Predictor for linear time trend only	10

Tables A3.2 and A3.3 present the coefficients (and the precise fractional polynomial powers) for each country or area-within-country for the primary analysis and the two sensitivity analyses. These analyses were based on two underlying analytic approaches that involved slightly different cuts of the data. These were:

1. **The data used for the primary analysis and sensitivity analysis 1:** In the primary analysis, the COVID period was defined as 1 April 2020 to 31 July 2020, and the pre-COVID period was the period for which data were available for each country or area-within-country to 31 March 2020. After fitting a model for a country or an area-within-country on the pre-COVID data, we calculated the observed number of suicides in the COVID period and used the model coefficients to estimate the expected number of suicides in the same period. Sensitivity analysis was based on these data and involved extending the COVID period from 31 July 2020 to the latest month for which data was available in any given country or area-within-country (up until 31 October 2020). Observed and expected suicides were therefore calculated over this longer period.

2. **The data used for sensitivity analysis 2:** In this analysis the COVID period was defined as beginning a month earlier, starting on 1 March 2020, and extending to 31 July 2020. Because this used one month less data to estimate the pre-COVID trends, a new model was fit to each country or area-within-countries, and observed and expected suicides calculated as above.

Table A3.2: Model coefficients for the primary analysis and sensitivity analysis 1 for all countries and areas-within-countries

Country or area within country	Model	FP1	FP2	Linear time, coef. (se)	FP 1 time, coef. (se)	FP 2 time, coef. (se)	Cosine 1, coef. (se)	Cosine 2, coef. (se)	Sine 1, coef. (se)	Sine 2, coef. (se)	Constant, coef. (se)
New South Wales, Australia	Linear time trend only			0.0120 (0.0087)							4.2830 (0.0736)
Queensland, Australia	Linear time trends and seasonality			0.0022 (0.0011)			0.0830 (0.0230)	0.0125 (0.0231)	-0.0562 (0.0236)	0.0423 (0.0231)	4.0832 (0.0326)
Victoria, Australia	Linear time trends and seasonality			0.0032 (0.0012)			0.0431 (0.0248)	0.0010 (0.0249)	-0.0089 (0.0253)	-0.0049 (0.0249)	3.9877 (0.0355)
Carinthia, Austria	Linear time trends and seasonality			-0.0183 (0.0079)			-0.0795 (0.0833)	-0.0640 (0.0825)	-0.0042 (0.0856)	-0.0944 (0.0834)	2.4433 (0.1121)
Tyrol, Austria	Linear time trends and seasonality			-0.0047 (0.0063)			-0.0215 (0.0689)	0.0338 (0.0693)	0.1786 (0.0737)	0.0391 (0.0699)	2.3611 (0.0944)
Vienna, Austria	Linear time trend only			-0.0144 (0.0202)							2.6585 (0.1614)
Alberta, Canada	Linear time trends and seasonality			-0.0012 (0.0013)			0.0117 (0.0276)	-0.0349 (0.0275)	-0.0043 (0.0277)	0.0077 (0.0275)	3.9696 (0.0382)
British Columbia, Canada	Linear time trends and seasonality			0.0083 (0.0039)			-0.0712 (0.0419)	0.0081 (0.0421)	0.0472 (0.0437)	0.0312 (0.0422)	3.8392 (0.0605)

Country or area within country	**Model**	**FP1**	**FP2**	**Linear time, coef. (se)**	**FP 1 time, coef. (se)**	**FP 2 time, coef. (se)**	**Cosine 1, coef. (se)**	**Cosine 2, coef. (se)**	**Sine 1, coef. (se)**	**Sine 2, coef. (se)**	**Constant, coef. (se)**
Manitoba, Canada	Linear time trend only			0.0060 (0.0145)							2.8983 (0.1205)
Chile	Linear time trends and seasonality			0.0001 (0.0009)			0.0692 (0.0184)	0.0319 (0.0186)	-0.1230 (0.0191)	0.0105 (0.0186)	5.0388 (0.0260)
Croatia	Non-linear time trends and seasonality	0	2		0.0019 (0.0013)	-0.0017 (0.0005)	-0.1302 (0.0257)	-0.0067 (0.0253)	-0.0049 (0.0251)	0.0271 (0.0249)	3.9942 (0.0245)
Thames Valley, England	Linear time trend only			0.0097 (0.0152)							2.7988 (0.1275)
Estonia	Linear time trends and seasonality			-0.0007 (0.0022)			-0.1359 (0.0463)	-0.0286 (0.0462)	0.1015 (0.0468)	-0.0697 (0.0462)	2.8250 (0.0647)
Cologne and Leverkusen, Germany	Linear time trend only			-0.0070 (0.0179)							2.5110 (0.1455)
Frankfurt, Germany	Linear time trend only			0.0144 (0.0240)							1.8285 (0.2323)
Leipzig, Germany	Linear time trend only			0.0724 (0.0246)							1.2252 (0.2295)
Udine and Pordenone, Italy	Linear time trends and seasonality			0.0001 (0.0041)			-0.0449 (0.0842)	0.0386 (0.0853)	0.1465 (0.0881)	0.0096 (0.0855)	1.8550 (0.1191)

Country or area within country	Model	FP1	FP2	Linear time, coef. (se)	FP 1 time, coef. (se)	FP 2 time, coef. (se)	Cosine 1, coef. (se)	Cosine 2, coef. (se)	Sine 1, coef. (se)	Sine 2, coef. (se)	Constant, coef. (se)
Japan	Non-linear time trends and seasonality	2	-2		0.0008 (0.0006)	-0.0216 (0.0056)	-0.0451 (0.0111)	-0.0347 (0.0109)	0.0595 (0.0108)	0.0114 (0.0107)	7.5177 (0.0168)
Netherlands	Linear time trends and seasonality			-0.0016 (0.0008)			0.0210 (0.0160)	0.0166 (0.0161)	0.0077 (0.0165)	0.0034 (0.0162)	5.0817 (0.0223)
New Zealand	Linear time trends and seasonality			0.0035 (0.0014)			-0.0221 (0.0285)	0.0157 (0.0288)	-0.0450 (0.0294)	-0.0388 (0.0288)	3.9089 (0.0414)
Poland	Non-linear time trends and seasonality	-2	-2		-0.0077 (0.0089)	-0.0037 (0.0039)	-0.1048 (0.0200)	-0.0231 (0.0201)	0.0463 (0.0209)	-0.0358 (0.0197)	6.0759 (0.0175)
South Korea	Non-linear time trends and seasonality	3	3		0.0040 (0.0031)	-0.0022 (0.0020)	-0.0611 (0.0155)	-0.0489 (0.0152)	0.0336 (0.0152)	0.0019 (0.0152)	6.9704 (0.0196)
Las Palmas, Spain	Linear time trends and seasonality			0.0009 (0.0030)			-0.1440 (0.0624)	-0.0638 (0.0617)	0.0189 (0.0618)	0.0418 (0.0618)	2.3315 (0.0874)
California, US	Non-linear time trends and seasonality	-1	0		0.0774 (0.0443)	-0.0197 (0.0108)	-0.0732 (0.0165)	0.0191 (0.0163)	0.0078 (0.0168)	0.0242 (0.0164)	5.8582 (0.0383)
Illinois (Cook County), US	Non-linear time trends	0	1		-0.5521 (0.2317)	-0.2126 (0.0878)	-0.0683 (0.0394)	-0.0983 (0.0380)	0.0395 (0.0373)	0.0095 (0.0374)	4.1362 (0.1969)

Country or area within country	Model	FP1	FP2	Linear time, coef. (se)	FP 1 time, coef. (se)	FP 2 time, coef. (se)	Cosine 1, coef. (se)	Cosine 2, coef. (se)	Sine 1, coef. (se)	Sine 2, coef. (se)	Constant, coef. (se)
	and seasonality										
Louisiana, US	Linear time trends and seasonality			-0.0010 (0.0033)			-0.1490 (0.0350)	-0.0338 (0.0349)	0.0196 (0.0361)	0.0214 (0.0351)	4.0957 (0.0494)
New Jersey, US	Non-linear time trends and seasonality	0	2		0.0895 (0.0352)	-0.0020 (0.0008)	-0.0254 (0.0288)	0.0387 (0.0288)	0.0118 (0.0295)	-0.0165 (0.0288)	4.1292 (0.0279)
Texas (4 counties), US	Linear time trends and seasonality			0.0026 (0.0016)			-0.0517 (0.0320)	-0.0006 (0.0322)	0.0318 (0.0327)	0.0191 (0.0322)	3.4275 (0.0458)
Puerto Rico, US	Non-linear time trends and seasonality	3	2		0.0732 (0.0415)	-0.0537 (0.0259)	0.0407 (0.0556)	-0.0278 (0.0550)	-0.0364 (0.0555)	-0.0285 (0.0553)	2.8761 (0.0910)
Botucato, Brazil	Linear time trend only			-0.0179 (0.0615)							0.1222 (0.4887)
Macelo, Brazil	Linear time trend only			0.0123 (0.0353)							1.0758 (0.2973)
Ecuador	Non-linear time trends and seasonality	-1	1		-0.0182 (0.0084)	0.0152 (0.0064)	-0.0448 (0.0220)	0.0392 (0.0216)	-0.0288 (0.0223)	-0.0168 (0.0218)	4.6015 (0.0279)
Mexico City, Mexico	Linear time trend only			0.0086 (0.0108)							3.7666 (0.0904)

Country or area within country	Model	FP1	FP2	Linear time, coef. (se)	FP 1 time, coef. (se)	FP 2 time, coef. (se)	Cosine 1, coef. (se)	Cosine 2, coef. (se)	Sine 1, coef. (se)	Sine 2, coef. (se)	Constant, coef. (se)
Peru	Non-linear time trends and seasonality	0	2		0.1371 (0.0314)	-0.0292 (0.0083)	0.0536 (0.0334)	0.0003 (0.0326)	-0.0419 (0.0333)	-0.0294 (0.0328)	3.5707 (0.0527)
Saint Petersburg, Russian Federation	Linear time trends and seasonality			-0.0036 (0.0019)			0.0165 (0.0395)	0.0811 (0.0405)	0.0735 (0.0421)	-0.0475 (0.0406)	3.4828 (0.0553)

Notes: Fractional polynomial powers that we tested were -2, -1, -0.5, 0, 0.5, 1, 2, 3, where 0 = log(time) and all other powers are $time^{-2}$, $time^{-1}$, etc.

Table A3.3: Model coefficients for sensitivity analysis 2 for all countries and areas-within-countries

Country or area within country	Model	FP1	FP2	Linear time, coef. (se)	FP 1 time, coef. (se)	FP 2 time, coef. (se)	Cosine 1, coef. (se)	Cosine 2, coef. (se)	Sine 1, coef. (se)	Sine 2, coef. (se)	Constant, coef. (se)
New South Wales, Australia	Linear time trend only			0.0111 (0.0101)							4.2871 (0.0790)
Queensland, Australia	Linear time trends and seasonality			0.0022 (0.0012)			0.0830 (0.0233)	0.0125 (0.0235)	-0.0564 (0.0243)	0.0422 (0.0237)	4.0833 (0.0335)
Victoria, Australia	Linear time trends and seasonality			0.0027 (0.0012)			0.0407 (0.0247)	0.0050 (0.0249)	-0.0158 (0.0257)	-0.0105 (0.0251)	3.9957 (0.0357)
Carinthia, Austria	Linear time trends and seasonality			-0.0145 (0.0082)			-0.0723 (0.0809)	-0.0760 (0.0802)	0.0259 (0.0858)	-0.0724 (0.0823)	2.4079 (0.1126)
Tyrol, Austria	Linear time trends and seasonality			-0.0072 (0.0070)			-0.0246 (0.0696)	0.0430 (0.0710)	0.1593 (0.0780)	0.0253 (0.0725)	2.3854 (0.0990)
Vienna, Austria	Linear time trend only			-0.0205 (0.0232)							2.6840 (0.1707)

Country or area within country	Model	FP1	FP2	Linear time, coef. (se)	FP 1 time, coef. (se)	FP 2 time, coef. (se)	Cosine 1, coef. (se)	Cosine 2, coef. (se)	Sine 1, coef. (se)	Sine 2, coef. (se)	Constant, coef. (se)
Alberta, Canada	Linear time trends and seasonality			-0.0008 (0.0014)			0.0139 (0.0276)	-0.0383 (0.0275)	0.0018 (0.0281)	0.0127 (0.0278)	3.9624 (0.0387)
British Columbia, Canada	Linear time trends and seasonality			0.0105 (0.0042)			-0.0682 (0.0412)	-0.0018 (0.0418)	0.0662 (0.0450)	0.0441 (0.0424)	3.8167 (0.0618)
Manitoba, Canada	Linear time trend only			0.0239 (0.0113)							2.8179 (0.0902)
Chile	Linear time trends and seasonality			-0.0002 (0.0009)			0.0678 (0.0185)	0.0342 (0.0188)	-0.1269 (0.0195)	0.0076 (0.0189)	5.0427 (0.0263)
Croatia	Non-linear time trends and seasonality	2	2		0.0019 (0.0013)	-0.0016 (0.0005)	-0.1300 (0.0260)	-0.0075 (0.0257)	-0.0035 (0.0258)	0.0282 (0.0254)	3.9930 (0.0251)
Thames Valley, England	Linear time trend only			-0.0019 (0.0160)							2.8499 (0.1218)

Country or area within country	**Model**	**FP1**	**FP2**	**Linear time, coef. (se)**	**FP 1 time, coef. (se)**	**FP 2 time, coef. (se)**	**Cosine 1, coef. (se)**	**Cosine 2, coef. (se)**	**Sine 1, coef. (se)**	**Sine 2, coef. (se)**	**Constant, coef. (se)**
Estonia	Linear time trends and seasonality			-0.0000 (0.0023)			-0.1321 (0.0462)	-0.0333 (0.0461)	0.1115 (0.0473)	-0.0607 (0.0466)	2.8131 (0.0655)
Cologne and Leverkusen, Germany	Linear time trend only			-0.0037 (0.0204)							2.4969 (0.1549)
Frankfurt, Germany	Linear time trend only			0.0103 (0.0275)							1.8497 (0.2471)
Leipzig, Germany	Linear time trend only			0.0942 (0.0251)							1.1083 (0.2226)
Udine and Pordenone, Italy	Linear time trends and seasonality			0.0002 (0.0043)			-0.0448 (0.0853)	0.0384 (0.0868)	0.1470 (0.0906)	0.0100 (0.0877)	1.8544 (0.1224)
Japan	Non-linear time trends and seasonality	0	1		0.0008 (0.0006)	-0.0217 (0.0059)	-0.0452 (0.0113)	-0.0347 (0.0111)	0.0594 (0.0111)	0.0113 (0.0110)	7.5179 (0.0173)

Country or area within country	Model	FP1	FP2	Linear time, coef. (se)	FP 1 time, coef. (se)	FP 2 time, coef. (se)	Cosine 1, coef. (se)	Cosine 2, coef. (se)	Sine 1, coef. (se)	Sine 2, coef. (se)	Constant, coef. (se)
Netherlands	Linear time trends and seasonality			-0.0015 (0.0008)			0.0215 (0.0162)	0.0158 (0.0164)	0.0090 (0.0169)	0.0045 (0.0165)	5.0801 (0.0229)
New Zealand	Linear time trends and seasonality			0.0037 (0.0015)			-0.0211 (0.0288)	0.0141 (0.0292)	-0.0422 (0.0302)	-0.0365 (0.0294)	3.9059 (0.0423)
Poland	Non-linear time trends and seasonality	3	-2		-0.0104 (0.0092)	-0.0049 (0.0040)	-0.1021 (0.0201)	-0.0264 (0.0203)	0.0533 (0.0218)	-0.0300 (0.0203)	6.0819 (0.0183)
South Korea	Non-linear time trends and seasonality	2	-2		-0.0005 (0.0009)	0.0033 (0.0015)	-0.0600 (0.0158)	-0.0489 (0.0156)	0.0359 (0.0155)	0.0034 (0.0154)	6.9788 (0.0178)
Las Palmas, Spain	Linear time trends and seasonality			0.0022 (0.0030)			-0.1367 (0.0613)	-0.0737 (0.0606)	0.0391 (0.0615)	0.0589 (0.0613)	2.3073 (0.0873)
California, US	Non-linear time trends	1	0		0.0469 (0.0285)	-0.0035 (0.0020)	-0.0730 (0.0168)	0.0198 (0.0167)	0.0062 (0.0174)	0.0234 (0.0168)	5.8691 (0.0341)

Country or area within country	Model	FP1	FP2	Linear time, coef. (se)	FP 1 time, coef. (se)	FP 2 time, coef. (se)	Cosine 1, coef. (se)	Cosine 2, coef. (se)	Sine 1, coef. (se)	Sine 2, coef. (se)	Constant, coef. (se)
	and seasonality										
Illinois (Cook County), US	Non-linear time trends and seasonality	3	2		-0.5802 (0.2377)	-0.2216 (0.0896)	-0.0666 (0.0397)	-0.1010 (0.0385)	0.0442 (0.0383)	0.0137 (0.0382)	4.1618 (0.2026)
Louisiana, US	Linear time trends and seasonality			-0.0010 (0.0037)			-0.1489 (0.0359)	-0.0340 (0.0362)	0.0201 (0.0389)	0.0217 (0.0369)	4.0952 (0.0525)
New Jersey, US	Non-linear time trends and seasonality	-2	0		-0.1282 (0.0532)	-0.0012 (0.0007)	-0.0218 (0.0286)	0.0359 (0.0287)	0.0189 (0.0295)	-0.0107 (0.0287)	4.2672 (0.0602)
Texas (4 counties), US	Linear time trends and seasonality			0.0030 (0.0016)			-0.0496 (0.0321)	-0.0039 (0.0323)	0.0379 (0.0333)	0.0242 (0.0326)	3.4202 (0.0466)
Puerto Rico, US	Non-linear time trends	-2	-2		0.0815 (0.0432)	-0.0598 (0.0272)	0.0395 (0.0561)	-0.0228 (0.0558)	-0.0432 (0.0566)	-0.0340 (0.0562)	2.8672 (0.0926)

Country or area within country	**Model**	**FP1**	**FP2**	**Linear time, coef. (se)**	**FP 1 time, coef. (se)**	**FP 2 time, coef. (se)**	**Cosine 1, coef. (se)**	**Cosine 2, coef. (se)**	**Sine 1, coef. (se)**	**Sine 2, coef. (se)**	**Constant, coef. (se)**
	and seasonality										
Botucato, Brazil	Linear time trend only			-0.0220 (0.0714)							0.1392 (0.5239)
Macelo, Brazil	Linear time trend only			0.0171 (0.0401)							1.0540 (0.3159)
Ecuador	Non-linear time trends and seasonality	3	3		-0.0204 (0.0090)	0.0171 (0.0070)	-0.0458 (0.0222)	0.0363 (0.0221)	-0.0253 (0.0230)	-0.0146 (0.0221)	4.6042 (0.0283)
Mexico City, Mexico	Linear time trend only			-0.0018 (0.0108)							3.8118 (0.0827)
Peru	Linear time trends and seasonality			0.0138 (0.0023)			0.0393 (0.0342)	-0.0109 (0.0346)	-0.0315 (0.0359)	-0.0281 (0.0347)	3.5826 (0.0520)
Saint Petersburg,	Linear time trends and seasonality			-0.0034 (0.0020)			0.0179 (0.0398)	0.0788 (0.0409)	0.0776 (0.0430)	-0.0441 (0.0413)	3.4780 (0.0564)

Country or area within country	Model	FP1	FP2	Linear time, coef. (se)	FP 1 time, coef. (se)	FP 2 time, coef. (se)	Cosine 1, coef. (se)	Cosine 2, coef. (se)	Sine 1, coef. (se)	Sine 2, coef. (se)	Constant, coef. (se)
Russian Federation											

Notes: Fractional polynomial powers that we tested were -2, -1, -0.5, 0, 0.5, 1, 2, 3, where 0 = log(time) and all other powers are $time^{-2}$, $time^{-1}$, etc.

Stata code used to generate all results

Each country or area within-country's data is set up such that there two columns of data. The first column is the year-month (e.g., January 2019). The second column is the number of suicides in that month. The corresponding variable names are *date* and *suicides*.

```
cd "S:\ADP020 - Global Suicide Study"
log using "Analysis and results `c(current_date)'.txt", text replace

tempfile myfile
tempname p

postfile `p' str40(country) double(analysis order exp obs fp1 fp2) str10(model)
using `myfile'

// list countries in the (reverse) order you want them in the graph
global dataset ///
       ADP020_20_01_RUSSIA_SAINTPETERSBURG ///
       ADP020_01_PERU ///
       ADP020_15_01_MEXICO_MEXICOCITY ///
       ADP020_23_ECUADOR ///
       ADP020_21_02_BRAZIL_MACELO ///
       ADP020_21_01_BRAZIL_BOTUCATU ///
       ADP020_13_04_USA_PUERTORICO ///
       ADP020_13_06_USA_TEXAS_4C ///
       ADP020_13_03_USA_NEWJERSEY ///
       ADP020_13_07_USA_LOUISIANA ///
       ADP020_13_02_USA_COOKCOUNTRY ///
       ADP020_13_01_USA_CALIFORNIA ///
       ADP020_25_01_SPAIN_LASPALMAS ///
       ADP020_07_KOREA ///
       ADP020_11_POLAND ///
       ADP020_08_NEWZEALAND ///
       ADP020_09_NETHERLANDS ///
       ADP020_06_JAPAN ///
       ADP020_19_01_ITALY_UDINE_PORDENONE ///
       ADP020_17_02_GERMANY_LEIPZIG ///
       ADP020_17_03_GERMANY_FRANKFURT ///
       ADP020_17_01_GERMANY_COLOGNE_LEVERKUSEN ///
       ADP020_18_ESTONIA ///
       ADP020_24_01_UK_THAMESVALLEY ///
       ADP020_05_CROATIA ///
       ADP020_02_CHILE ///
       ADP020_03_03_CANADA_MANITOBA ///
       ADP020_03_02_CANADA_BRITISH_COLUMBIA ///
       ADP020_03_01_CANADA_ALBERTA ///
       ADP020_14_03_AUSTRIA_VIENNA ///
       ADP020_14_02_AUSTRIA_TYROL ///
       ADP020_14_01_AUSTRIA_CARINTHIA ///
       ADP020_16_01_AUSTRALIA_VICTORIA ///
       ADP020_16_03_AUSTRALIA_QUEENSLAND ///
       ADP020_16_04_AUSTRALIA_NEWSOUTHWALES

// setup each country's dataset

local i = 1

foreach place of global dataset {

    import delimited using "data 20201211/`place'.csv", ///
             varnames(1) encoding("utf-8") clear
```

```
drop if suicides == .

// Country variable
gen str30 country = "`place'"

// Date and time variables
if real(substr(date, 1, 2)) != . {

    gen mdate = monthly(date, "YM", 2020)
        format mdate %tm
        label var mdate "Month and Year"
}
else {

    gen mdate = monthly(date, "MY", 2020)
        format mdate %tm
        label var mdate "Month and Year"
}

sort mdate
   drop if mdate >= tm(2020m11)

   // Leipzig -- drop data prior to 2019
   if "`place'" == "ADP020_17_02_GERMANY_LEIPZIG" {
          drop if mdate < tm(2019m1)
   }

// check there are at least 12 months of pre-COVID data
gen test = tm(2020m4) - mdate
    replace test = 12 if mdate >= tm(2019m4)
    assert test >= 12
    drop test

// time trends variables
gen time = _n - 1
label var time "Time trend"

gen degrees=(time/12)*360
gen cos_11 = cos(1 * _pi * degrees/180)
   gen cos_21 = cos(2 * _pi * degrees/180)
   gen sin_11 = sin(1 * _pi * degrees/180)
   gen sin_21 = sin(2 * _pi * degrees/180)

di as red "`place'"

// ------------------------------------------
// primary analysis -- April 2020 to July 2020
// ------------------------------------------

   if "`place'" == "ADP020_15_01_MEXICO_MEXICOCITY" | ///
      "`place'" == "ADP020_17_01_GERMANY_COLOGNE_LEVERKUSEN" | ///
      "`place'" == "ADP020_16_04_AUSTRALIA_NEWSOUTHWALES" | ///
      "`place'" == "ADP020_03_03_CANADA_MANITOBA" | ///
      "`place'" == "ADP020_14_03_AUSTRIA_VIENNA" | ///
      "`place'" == "ADP020_17_03_GERMANY_FRANKFURT" | ///
      "`place'" == "ADP020_21_01_BRAZIL_BOTUCATU" | ///
      "`place'" == "ADP020_21_02_BRAZIL_MACELO" | ///
      "`place'" == "ADP020_24_01_UK_THAMESVALLEY" | ///
      "`place'" == "ADP020_17_02_GERMANY_LEIPZIG" {

    glm suicides time if mdate < tm(2020m4), ///
        family(poisson) link(log) scale(x2)

          // save results to a matrix
          matrix table = r(table)'
          local model = "linear-no sin"
          local fp1 = .
          local fp2 = .
```

```
}
else {
   qui glm suicides time cos* sin* if mdate < tm(2020m4), ///
        family(poisson) link(log) scale(x2)

          estimates store linear

    qui fp <time>, scale all replace: glm suicides <time> cos* sin* ///
                  if mdate < tm(2020m4), family(poisson) link(log) scale(x2)

          estimates store fp

          lrtest fp linear

          if r(p) > 0.05 {
                 estimates restore linear
                 local model = "linear"
                 local fp1 = .
                 local fp2 = .
          }
          else {
                 estimates restore fp
                 local model = "fp"
                 local fp1 = el(e(fp_fp), 1, 1)
                 local fp2 = el(e(fp_fp), 1, 2)
          }
}
// show model
estimates replay

   // save results to a matrix
   matrix table = r(table)'

   // autocorrelation check
   predict resid, response
   wntestq resid

// expected values
predictnl expected = predict(), ci(min max) level(95)

qui sum expected if mdate >= tm(2020m4) & mdate <= tm(2020m7), detail
local exp = r(sum)

// observed values
qui sum suicides if mdate >= tm(2020m4) & mdate <= tm(2020m7), detail
local obs = r(sum)

// output to postfile
   post `p' ("`place'") (1) (`i') (`exp') (`obs') (`fp1') (`fp2') ("`model'")

   // save matrix as a dataset
   preserve
          local rownames : rowfullnames table
          local c : word count `rownames'

          drop _all
          svmat table, names(col)

          gen rownames = ""
          forvalues j = 1/`c' {
                 replace rownames = "`:word `j' of `rownames''" in `j'
          }

          gen model = 1
          gen place = `i'

          save "analysis/`place'_1_`i'", replace
```

```
            list
        restore

    // save dataset for drawing figures
    save "analysis/`place' - primary", replace

    // ------------------------------------------------------------
    // sensitivity analysis 1 -- April 2020 to latest data available
    // ------------------------------------------------------------

    // expected values
    qui sum expected if mdate >= tm(2020m4), detail
    local exp = r(sum)

    // observed values
    qui sum suicides if mdate >= tm(2020m4), detail
    local obs = r(sum)

    // output to postfile
    post `p' ("`place'") (2) (`i') (`exp') (`obs') (`fp1') (`fp2') ("`model'")

        // ---------------------------------------------------------------------
        // sensitivity analysis 2 - add 5% to observed values during Apr to Jul 2020
        // ---------------------------------------------------------------------

    // expected values
    qui sum expected if mdate >= tm(2020m4) & mdate <= tm(2020m7), detail
    local exp = r(sum)

    // observed values
    qui sum suicides if mdate >= tm(2020m4) & mdate <= tm(2020m7), detail
    local obs = r(sum) * 1.05

    // output to postfile
    post `p' ("`place'") (3) (`i') (`exp') (`obs') (`fp1') (`fp2') ("`model'")

        // ---------------------------------------------------------------------
--------
        // Sensitivity analysis 3 - add 5% to observed values during Apr to latest
available
        // ---------------------------------------------------------------------
--------

        // expected values
    qui sum expected if mdate >= tm(2020m4), detail
    local exp = r(sum)

    // observed values
    qui sum suicides if mdate >= tm(2020m4), detail
    local obs = r(sum) * 1.05

    // output to postfile
    post `p' ("`place'") (4) (`i') (`exp') (`obs') (`fp1') (`fp2') ("`model'")

        // clean-up for next analysis
    drop expected min max resid

    // ------------------------------------------------
    // sensitivity analysis 4 -- March 2020 to July 2020
    // ------------------------------------------------

        if "`place'" == "ADP020_15_01_MEXICO_MEXICOCITY" | ///
           "`place'" == "ADP020_17_01_GERMANY_COLOGNE_LEVERKUSEN" | ///
           "`place'" == "ADP020_16_04_AUSTRALIA_NEWSOUTHWALES" | ///
           "`place'" == "ADP020_03_03_CANADA_MANITOBA" | ///
           "`place'" == "ADP020_14_03_AUSTRIA_VIENNA" | ///
           "`place'" == "ADP020_17_03_GERMANY_FRANKFURT" | ///
```

```
           "`place'" == "ADP020_21_01_BRAZIL_BOTUCATU" | ///
           "`place'" == "ADP020_21_02_BRAZIL_MACELO" | ///
           "`place'" == "ADP020_24_01_UK_THAMESVALLEY" | ///
           "`place'" == "ADP020_17_02_GERMANY_LEIPZIG" {

         glm suicides time if mdate < tm(2020m3), ///
             family(poisson) link(log) scale(x2)

         // save results to a matrix
              matrix table = r(table)'
              local model = "linear-no sin"
              local fp1 = .
              local fp2 = .

    }
      else {
              qui glm suicides time cos* sin* if mdate < tm(2020m3), ///
             family(poisson) link(log) scale(x2)

              estimates store linear

         qui fp <time>, scale all replace: glm suicides <time> cos* sin* if mdate <
tm(2020m3), ///
             family(poisson) link(log) scale(x2)

              estimates store fp

              lrtest fp linear

              if r(p) > 0.05 {
                     estimates restore linear
                     local model = "linear"
                     local fp1 = .
                     local fp2 = .
              }
              else {
                     estimates restore fp
                     local model = "fp"
                     local fp1 = el(e(fp_fp), 1, 1)
                     local fp2 = el(e(fp_fp), 1, 2)
              }
    }
      estimates replay

      // save results to a matrix
      matrix table = r(table)'

      // autocorrelation check
      predict resid, response
      wntestq resid

    // expected values
    predictnl expected = predict(), ci(min max) level(95)

    qui sum expected if mdate >= tm(2020m3) & mdate <= tm(2020m7), detail
    local exp = r(sum)

    // observed values
    qui sum suicides if mdate >= tm(2020m3) & mdate <= tm(2020m7), detail
    local obs = r(sum)

    // output to postfile
    post `p' ("`place'") (5) (`i') (`exp') (`obs') (`fp1') (`fp2') ("`model'")

      // save matrix as a dataset
      preserve
             local rownames : rowfullnames table
             local c : word count `rownames'
```

```
            drop _all
            svmat table, names(col)

            gen rownames = ""
            forvalues j = 1/`c' {
                    replace rownames = "`:word `j' of `rownames''" in `j'
            }

            gen model = 5
            gen place = `i'

            save "analysis/`place'_3_`i'", replace

            list
        restore

        // save dataset for drawing figures
    save "analysis/`place' - secondary", replace

        // clean-up and prepare for the next loop
    local i = `i' + 1
    local fp1 = .
    local fp2 = .

}

postclose `p'


// ----------------------------------
// Create dataset of summary estimates
// ----------------------------------

use `myfile', clear

bysort order: assert _N == 5

label define analysis ///
    1   "Primary analysis (Apr 2020 to Jul 2020)" ///
    2   "Sensitivity analysis 1 (Apr 2020 to latest available)" ///
    3   "Sensitivity analysis 2: adding 5% to obs (Apr to Jul 2020)" ///
    4   "Sensitivity analysis 3: adding 5% to obs (Apr to latest available)" ///
    5   "Sensitivity analysis 4 (Mar 2020 to Jul 2020)"

label values analysis analysis

recode order ///
        (1 = 1 "Peru") ///
        (2 = 2 "Russia") ///
        (3 = 3 "Mexico") ///
        (4 = 4 "Ecuador") ///
        (5 6 = 5 "Brazil") ///
        (7/11 = 6 "US") ///
        (12 = 7 "Spain") ///
        (13 = 8 "South Korea") ///
        (14 = 9 "Poland") ///
        (15 = 10 "New Zealand") ///
        (16 = 11 "Netherlands") ///
        (17 = 12 "Japan") ///
        (18 = 13 "Italy") ///
        (19/21 = 14 "Germany") ///
        (22 = 15 "Estonia") ///
        (23 = 16 "England") ///
        (24 = 17 "Croatia") ///
        (25 = 18 "Chile") ///
        (26/28 = 19 "Canada") ///
        (29/31 = 20 "Austria") ///
```

```
       (32/34 = 21 "Australia"), gen(place)

label var obs "Observed"
label var exp "Expected"
format obs exp %8.0fc

gen log_rr = log(obs / exp)
gen se_rr =  1 / sqrt(obs)

label var log_rr "Log rate ratio"
label var se_rr "Log standard error"
label var country "Country"

// 95% CIs of all estimates
gen min = log_rr - 1.96 * se_rr
gen max = log_rr + 1.96 * se_rr


// save data for export
export delimited using "analysis/summary_data", quote replace
```

Country/area-within-country suicide data

Country	Area-within-country	Source of suicide data	Suicide data details	Suicide data availability
High-income countries[a]				
Australia	New South Wales	New South Wales Health[c]	Suicide data were sourced from the New South Wales Suicide Monitoring and Data Management System (NSWSMDMS). The NSWSMDMS draws on police and coronial data. Deaths are flagged as "suspected" suicides in a two-step process that involves automated screening and manual checking. The majority of these are ultimately recoded as "confirmed suicides". "Suspected suicides" and "confirmed suicides" (combined) were used as the unit of counting across the study period, removing the possible impact of changes in counts as investigations proceed.	Jan 2019 – Sep 2020
	Queensland	Australian Institute of Suicide Research and Prevention[d]	Suicide data came from the interim Queensland Suicide Register (iQSR). The iQSR relies on police reports of deaths prepared for coroners. iQSR coders classify the probability of the death being a suicide as "possible", "probable", or "beyond reasonable doubt". For all analyses, deaths classified as "probable" or "beyond reasonable doubt" are considered "suspected suicides". In the iQSR, these "suspected suicides" are not updated to "confirmed suicides", so using them as the unit of counting across the whole study timeframe ensured a like-with-like comparison between the pre-COVID and COVID periods. There is a high level of correspondence between the number of "suspected suicides" recorded in the iQSR and the official suicide figures reported by the Australian Bureau of Statistics (ABS); for example, in 2016, there were 675 "suspected suicides" recorded in the iQSR and 688 reported for Queensland by the ABS.	Jan 2016 – Aug 2020
	Victoria	Coroners Court of Victoria[e]	Suicide data were sourced from the Victorian Suicide Register (VSR). Potential suicides are initially identified and included in the VSR through review of police reports and case notes for deaths reported to the Coroners Court of Victoria. Deceased intent is coded as "intentional self-harm" (if they occur in circumstances consistent with suicide), "unable to be determined" (if the available evidence is equivocal) or "still enquiring" (if there is insufficient evidence to date on deceased intent). Cases where the deceased intent is coded as "intentional self-harm" are deemed to be suicides. Intent coding is reviewed as the coronial investigation continues and finalised once it is completed. In the current study, the deceased intent coding for older data (2016 to 2019), would have been reviewed at least once; these data can be considered to be highly reliable and likely to change only very slightly upon any further review. For the more recent data, particularly in deaths that occurred after March 2020, minimal review had occurred after initial coding; based on past experience, the suicide frequency during this latter period would be likely be revised down slightly (≈2-4%). There is a high degree of concordance between VSR data and official data from the Australian Bureau of Statistics (ABS); comparing ABS and VSR data for Victorian suicides between 2016 to 2019, the difference in aggregate frequencies was 1.1%.	Jan 2016 – Sep 2020

Country	Area-within-country	Source of suicide data	Suicide data details	Suicide data availability
Austria	Carinthia	Kärntner Suiziddatenbank, Amt der Kärntner Landesregierung[d]	Suicide data were sourced from the Carinthian Suicide Database (Kärntner Suiziddatenbank) which has existed since 2018. This database draws on police reports and case notes of the Red Cross (which is always involved in suicide cases) and both psychiatric departments of Carinthia. Each case is checked and rechecked and the overall figures are compared with relevant data from the Austrian suicide database, which is part of the official Statistik Austria. The data are timely; cases are up-to-date at the end of each month.	Jan 2018 – Aug 2020
	Tyrol	Tyrol Suicide Register[d]	Suicide data were sourced from the Tyrol Suicide Register (TSR). The TSR draws on data from police reports of deaths judged to be suicides by a public medical officer. These deaths were used as the unit of counting across the study period. There is no evidence that the assessment procedure changed after the beginning of the pandemic.	Jan 2018 – Oct 2020
	Vienna	Municipal Health Service[d]	Suicide data were sourced from the Municipal Health Service. To provide further cross-validity, data were also sourced from the Police and Vienna´s public transport service, which provided further evidence for the completeness of the Municipal Health Service data source.	Jan 2019 – Oct 2020
Canada	Alberta	Office of the Chief Medical Examiner[d,f]	The data source was records from the Office of the Chief Medical Examiner of Alberta. The standard for identifying a suicide was evidence of intent to die, including preparations for death inappropriate to or unexpected in the context of the decedent's life, expression of parting or the desire to die or an acknowledgment of impending death. The data provided may not be entirely complete as some investigations from 2019 and 2020 may be ongoing.	Jan 2016 – Aug 2020
	British Columbia	British Columbia Coroners Service[g]	Suicide deaths were sourced from the British Columbia Coroners Services (BCCS) which operates in a live database environment. A finding of suicide is made on the balance of probabilities, in that it is more likely than not, that the death was the result of intentional self-harm. The numbers are tabulated on the basis of cases that satisfy the criteria mentioned. The data are preliminary and subject to change as coroners' investigations are finalised.	Jan 2018 – Aug 2020
	Manitoba	Office of the Chief Medical Examiner[d]	Data were sourced from the Office of the Chief Medical Examiner. The definition of suicide used was death resulting from a volitional act of the decedent with the knowledge that said act would be likely to result in self-harm. The standard of certifying a death as suicide was according to a high degree of probability throughout. The data provided should be considered final/not preliminary. The manner of death certification does not take place until the end of the investigation, so it is extremely unlikely that it would change without the appearance of new relevant information.	Jan 2019 – Oct 2020
Chile	Whole country	Department of Statistics and Health Information[h]	Suicide data were sourced from the national Department of Statistics and Health Information (DEIS), which in turn receives data from the National Institute of Statistics (INE) and the Civil Register and Identification Service (SRCeI). At the time of sourcing, 2019 registered deaths were in the phases of reviewing, validation and coding, while 2020 registered deaths were in the phase of data recollection. Therefore, data for these two years may be subject to change. Cause of death is coded based on ICD-10 and suicide defined as X60-X84.	Jan 2016 – Oct 2020

Country	Area-within-country	Source of suicide data	Suicide data details	Suicide data availability
Croatia	Whole country	Ministry of the Interior[d]	Suicide data were based on mandatory death reports (certificates) that accompany all deaths. Causes of death are determined by medical doctors, immediately (and then also filed and submitted), or in case of any uncertainty, after autopsy. Data from both possible sources, death and autopsy reports, are submitted to the Ministry of the Interior Affairs and are then aggregated and statically analysed by the National Committed Suicide Registry by the Croatian institute of Public Health (and as such publicly published in their annual reports). For the study period, all the reports on death deemed to be suicides were completed and filed accordingly (fully closed) and they were used as the unit of counting across study period.	Jan 2016 – Oct 2020
England	Thames Valley	Thames Valley Police[d]	The Thames Valley Real Time Suicide Surveillance (RTSS) data are primarily collected from police reports to the Coroners Services in Oxfordshire, Berkshire, Buckinghamshire and Milton Keynes. The data are provided either directly by the officers following attendance at the suspected suicide or subsequently by the coroners' teams themselves (especially in hospital-reported deaths post incident). An audit is conducted approximately every two months in which RTSS data are compared with coroners' records, and there is minimal correction post inquest outcome.	Jan 2019 – Oct 2020
Estonia	Whole country	National Institute for Health Development[d]	Suicide data were sourced from the Estonian Causes of Death Registry managed by the National Institute for Health Development. Information is gathered from death certificates, which are filled in by medical doctors and forensic pathologists who have ascertained death. The ICD-10 is used to code the causes of death, and all deaths coded as X60 – X84 are considered to be suicides. All causes of death had been finalised in the study period. Deaths deemed to be suicides by this process were used as the unit of counting across the study period.	Jan 2016 – Sep 2020
Germany	Cologne and Leverkusen	Police Headquarters Cologne[d]	Suicide data were sourced from the relevant police office, Police Headquarters Cologne. At the request of the public prosecutor, police investigate all deaths for which there is doubt about the cause or suicide is suspected. The police office provides data on deaths that are then confirmed to be suicides to the local health department, which then passes them on to the State Statistical Offices. All of the cases in the current study were confirmed as suicide by the police, and no investigations were pending.	Jan 2019 – Oct 2020
	Frankfurt	Research Project FraPPE / Frankfurt Municipal Health Authority / University Hospital Frankfurt[d]	Suicide data were sourced from the Research Project Frappe, based on autopsy data which were obtained in the same way the whole study period so biases during the latter months are minimal.	Jan 2019 – Jul 2020
	Leipzig	Leipzig Health Authority[d]	Suicide data were based on cause of death statistics provided by the Leipzig Health Authority (LHA). Cause of death is determined by medical doctors, and if it is uncertain or non-natural an autopsy may	Jan 2019 – Jul 2020

Country	Area-within-country	Source of suicide data	Suicide data details	Suicide data availability
			be conducted. The LHA collates statistics on causes of death from death certificates and autopsy results. All autopsies had been completed and all causes of death had been finalised in the study period. Deaths deemed to be suicides by this process were used as the unit of counting across the study period.	
Italy	Udine and Pordenone	Regional Scoial and Health Information System (SISSR) of the Friuli Venezia Guilia (FVG) Region[d]	Suicide data were obtained from the Regional Social and Health Information System (SISSR) of the Friuli Venezia Giulia (FVG) Region, available for consultation at the Epidemiological Service, Healthcare Agency for Health Coordination. They were identified through the Death Register of Region FVG, which uses ICD-9 codes E95*and E98* for intentional self-harm and events of undetermined intent. The Death Register collects data on cause of death based on death certificates, as provided by the National Institute of Statistics (Istat). The certificates are completed by a physician, usually a coroner. Deaths due to undetermined intent are rare (approximately 10%), and they were deemed to be "suspected suicides" for the purpose of this study. These data are used for regional mortality statistics and were registered in the same way for the full study period. The south-eastern area of the region, corresponding to Trieste and Gorizia areas, was excluded from the analysis, due to a delay in mortality data registration.	Jan 2016 – Jul 2020
Japan	Whole country	National Police Agency[i]	Suicide data were sourced from the National Police Agency (NPA). The NPA suicide statistics are derived from police investigations of suicide cases. All suspected suicides are investigated by the police, and the NPA records all deaths that are deemed to be suicides following this investigation. The data used in this study are provisional data, but the discrepancy between the provisional and the finalised data (released in March the following year) has been ≈1% in the past three years. The NPA data are closely correlated with those tabulated by the Ministry of Health, Labour, and Welfare, which are based on death certificates (r=0.995 for suicides occurring between 1978 and 2018).	Jan 2016 – Oct 2020
Netherlands	Whole country	Statistics Netherlands[d]	Suicide data are based on the cause of death statistics, sourced from Statistics Netherlands. This is a legal registration of causes of death of all deceased residents of the Netherlands. A cause of death certificate is completed by a medical doctor for every deceased person, and in case of uncertainty about a (un)natural cause of death, by a coroner. This statement of cause of death is sent to and processed at Statistics Netherlands. The data up to and including 2019 is final. The data in 2020 is preliminary. However, minimal numbers have been added in previous years when data was still preliminary, so no major adjustments are expected.	Jan 2016 – Jul 2020
New Zealand	Whole country	Coronial Services of New Zealand[d,j]	Suicide data were sourced from Coronial Services. These data are published as provisional and are a count of deaths that the police have notified the Coroner as being "suspected suicides". These deaths are subsequently investigated by the Coroner, and those with a finding/verdict of suicide are later published by the New Zealand Ministry of Health, as "confirmed deaths by suicide", after a delay of several years due to delays in Coronial inquests. The provisional Coronial Services data were used across the full study period.	Jan 2016 – Oct 2020

Country	Area-within-country	Source of suicide data	Suicide data details	Suicide data availability
Poland	Whole country	Working Group on Prevention of Suicide and Depression at Public Health Council Ministry of Health[d]	Suicide data were provided by the Working Group on Prevention of Suicide and Depression at Public Health Council Ministry of Health. These.data are gathered by the National Police Headquarters on the basis of police reports. (In Poland, suicide data are also gathered by Statistics Poland). Since 2013, police have entered data on given suicide cases into a database (called "KSIP-10 reporting suicide/suicidal behaviour" since 2017), immediately after it has been determined that a suicide took place. Data can be modified for up to one month, enabling modifications to the record in the event that additional suicides are identified or deaths that were previously identified as suicides are no longer thought to be so. After one month, the system "freezes" the data and no further updates can be made. These data were used as the unit of counting across the study period. In Poland	Jan 2018 – Oct 2020
South Korea	Whole country	Statistics Korea[k]	Suicide data were taken from figures published by Statistics Korea. Data for January 2016 to December 2019 are finalised figures while data for January to September 2020 are preliminary. Statistics Korea releases the provisional numbers within about two months, and then releases the finalised figures in September of the following year. In terms of counting provisional cases, a death was classified as a suicide if either the death certificate or the police report indicated that it was a suicide. The cases reported as being due to different causes of death are comprehensively investigated to and are reflected only in the finalised numbers. The finalised figures may be 3-7% higher than the provisional counts, based on 2018 and 2019 data.	Jan 2016 – Sep 2020
Spain	Las Palmas	Institute of Legal Medicine[d]	Suicide data were sourced from Institute of Legal Medicine from Las Palmas de Gran Canaria. These are based on death certificates and are the same statistics provided to the Spanish National Statistics Institute to produce the official annual death reports. Although coroners' verdicts could change as they complete pending investigations, these changes are not reflected in the death certificates nor in the National Statistics Institute figures. In any case, such changes are uncommon.	Jan 2016 – Oct 2020
United States	California	California Department of Public Health[l]	Suicide data were sourced from the California Department of Public Health. The information was derived from collating records available from the California Electronic Death Registration System where the cause of death was coded as X60-X84 in ICD-10.	Jan 2017 – Sep 2020
	Illinois (Cook County)	Medical Examiner Case Archive[m]	Suicide data were sourced from the Medical Examiner Case Archive (MECA) which collates suicide cases that occur in Cook County under the Medical Examiner's jurisdiction. The total suicides according to MECA will differ from the total provided in other statistical collections in that not all suicides that occur in Cook County are reported to the Medical Examiner or fall under their jurisdiction. These data were used consistently across the study period, however.	Jan 2016 – Oct 2020
	Louisiana	Louisiana Department of Health[d]	Suicide data were based on cause of death statistics provided by death record filed with the Louisiana Department of Health. Cause of death is determined by coroners. Examining pathologists work for and report to coroners who make the ultimate determination. Data from the latter months in the study period should be regarded as preliminary and subject to amendment. However, the number of pending investigations was relatively small and a number of these would ultimately not be classified as suicides.	Jan 2018 – Jul 2020

Country	Area-within-country	Source of suicide data	Suicide data details	Suicide data availability
	New Jersey	New Jersey Department of Health[n]	Suicide data were sourced from the New Jersey Death Certificate database, which draws on data from death certificates. New Jersey law requires death certificates to be completed by the proper authority (e.g., hospital personnel, medical doctors, medical examiners, funeral directors) and filed promptly. These certificates are submitted to the office of the State Registrar, where they are recorded and filed permanently. Deaths deemed to be suicides according to this death certificate data were used as the unit of counting across the study period.	Jan 2016 – Oct 2020
	Texas (Denton, Johnson, Parker, Tarrant Counties)	Medical Examiners Case Records[o]	Suicide counts were collated from individual reports released from Medical Examiners Case Records, spanning four counties in Texas– Denton, Johnson, Parker, Tarrant Counties. This is updated in daily basis. Individual cases in which the manner of death was coded as "suicide" were selected and aggregated.	Jan 2016 – Oct 2020
	Puerto Rico[b]	Health Department[p]	Suicide data were sourced from the monthly suicide report issued by the Puerto Rico Forensic Sciences Institute (which is the sole medical examiner of Puerto Rico and its municipalities) as reported by the Health Department. Preliminary data may subsequently be updated as more conclusive findings are returned. Deaths deemed to be suicide according to this data source were used as the unit of counting across the study period	Jan 2016 – Oct 2020
Upper middle-income countries[a]				
Brazil	Botucatu	Municipal Secretary of Health[d]	Suicide data were based on death certificates that are completed by a medical doctor who certifies the cause of death (as “suicide” or “undetermined cause”); in Brazil, burials cannot take place without the presentation of such death certificate. Information from death certificates at a county level is submitted by the respective Municipal Secretaries of Health to the federal Ministry of Health, which publishes the data and sends them to the World Health Organization. In the event of a possible subsequent inquiry modifying the originally recorded cause of death, the central federal data are not changed because the case is regarded as “closed”. All data in the current study came from Municipal Secretaries of Health and will be submitted to the Ministry of Health, and can be considered “closed cases”.	Jan 2019 – Sep 2020
	Maceió	Municipal Secretary of Health[d]	Suicide data were based on death certificates that are completed by a medical doctor who certifies the cause of death (as “suicide” or “undetermined cause”); in Brazil, burials cannot take place without the presentation of such death certificate. Information from death certificates at a county level is submitted by the respective Municipal Secretaries of Health to the federal Ministry of Health, which publishes the data and sends them to the World Health Organization. In the event of a possible subsequent inquiry modifying the originally recorded cause of death, the central federal data are not changed because the case is regarded as “closed”. All data in the current study came from Municipal Secretaries of Health and will be submitted to the Ministry of Health, and can be considered “closed cases”.	Jan 2019 – Sep 2020

Country	Area-within-country	Source of suicide data	Suicide data details	Suicide data availability
Ecuador	Whole country	Government Ministry (Police Reports)[d]	Suicide data were sourced from police reports (Dirección Nacional de Delitos contra la Vida, Muertes Violentas, Desapariciones, Extorsión y Secuestro (DINASED) de la Policía Nacional, Ministerio de Gobierno) for the whole study period. These reports capture 80-95% of all suicides that are represented in the official statistics of the National Institution of Statistics and Information (INEC), because some information is not collected by the police (e.g., cases where the person makes a suicide attempt and subsequently dies in hospital). However, the consistent use of police data across the study period means that like-with-like comparisons were made. In addition, the distribution of suicide methods was similar across the whole period, instilling further confidence that biases were not introduced in the latter period.	Jan 2017 – Oct 2020
Mexico	Mexico City	Attorney General's Office, Government of Mexico City[q]	Data were sourced from the Attorney General's Office. This dataset records crimes, and one of these is labelled "loss of life by suicide". This was used as the unit of counting across the study period.	Jan 2019 – Oct 2020
Peru	Whole country	National Death Registry Information System[r]	Data were sourced from the National Death Registry Information System, which is the computer application that generates death certificates and aggregates these into a statistical report. Data are updated on a daily basis.	Jan 2017 – Sep 2020
Russian Federation	Saint Petersburg	Saint Petersburg City Bureau of Forensic Medical Examinations[d]	Suicide data originate from registries of the Saint Petersburg City Bureau of Forensic Medical Examinations. These data are referred as "preliminary" and after confirmation from police authorities are transferred into the open access system of the demographic statistics of Saint Petersburg. Any discrepancy between "preliminary" and "confirmed" suicides may be positive or negative, and in most cases within the range 5% from initial numbers.	Jan 2016 – Jul 2020

a. Source: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups
b. Unincorporated territory of the United States
c. Source: https://www.health.nsw.gov.au/mentalhealth/resources/Publications/suicide-monitoring-report-oct-20.pdf
d. Data received directly from source
e. Source: https://www.coronerscourt.vic.gov.au/sites/default/files/2020-10/Coroners%20Court%20Suicide%20Data%20Report%20-%20Report%202%20-%2005102020.pdf
f. Source: https://www2.gov.bc.ca/assets/gov/birth-adoption-death-marriage-and-divorce/deaths/coroners-service/statistical/suicide_knowledge_update.pdf
g. Source: https://calgary.ctvnews.ca/alberta-suicide-deaths-trend-downward-despite-pandemic-recession-1.5100299
h. Source: https://public.tableau.com/profile/deis4231#!/vizhome/DefuncionesSemanales1_0/DEF?publish=yes
i. Source: https://www.npa.go.jp/publications/statistics/safetylife/jisatsu.html
j. Source: https://coronialservices.justice.govt.nz/assets/Documents/Publications/2020-Annual-Provisional-Suicide-Statistics.pdf
k. Source: http://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_1B34E17&conn_path=I3
l. Source: https://data.chhs.ca.gov/dataset/statewide-death-profiles
m. Source: https://datacatalog.cookcountyil.gov/Public-Safety/Medical-Examiner-Case-Archive-Manner-of-Death-Char/jjtx-2ras
n. Source: https://www-doh.state.nj.us/doh-shad/query/result/provdth/Mort/Count.html

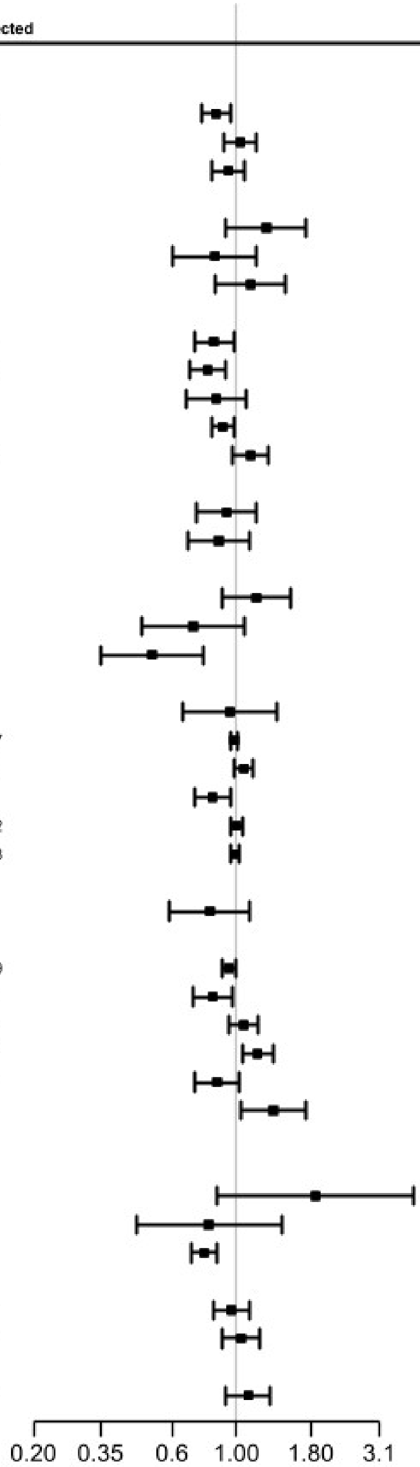
o. Source: https://mepublic.tarrantcounty.com/
p. Source: http://www.salud.gov.pr/Estadisticas-Registros-y-Publicaciones/Pages/Suicidio.aspx
q. Source: Víctimas en carpetas de investigación FGJ — Datos CDMX (opendatasoft.com)
r. Source: https://www.datosabiertos.gob.pe/dataset/informaci%C3%B3n-de-fallecidos-del-sistema-inform%C3%A1tico-nacional-de-defunciones-sinadef-ministerio

Raw data from countries and areas-within-countries

Monthly suicide counts are included below for all countries and areas-within-countries for which data were publicly available or for which data custodians have provided permission for data to be shared. Note also that cells with small numbers (≤10) have been redacted to ensure that no individuals can be identified.

Post-hoc analysis: Observed (+5%) and expected numbers of suicides in COVID-19 period (1 April 2020 to 31 July 2020) based on trends in pre-COVID-19 period (at least 1 January 2019 to 31 March 2020), by country or area-within-country

Country	Observed	Expected	RR (95% CI)
High Income Countries			
Australia			
New South Wales [1]	300	354	0.85 (0.76-0.95)
Queensland [2]	249	241	1.03 (0.91-1.17)
Victoria [2]	232	247	0.94 (0.82-1.07)
Austria			
Carinthia [2]	38	30	1.27 (0.92-1.74)
Tyrol [2]	35	41	0.84 (0.60-1.18)
Vienna [1]	50	45	1.12 (0.85-1.47)
Canada			
Alberta [2]	165	197	0.84 (0.72-0.98)
British Columbia [2]	198	250	0.80 (0.69-0.91)
Manitoba [1]	68	80	0.85 (0.67-1.08)
Chile [2]	495	551	0.90 (0.82-0.98)
Croatia [3]	200	178	1.12 (0.97-1.29)
England			
Thames Valley [1]	71	77	0.93 (0.73-1.17)
Estonia [2]	67	77	0.87 (0.69-1.11)
Germany			
Cologne and Leverkusen [1]	51	44	1.17 (0.89-1.54)
Frankfurt [1]	23	32	0.71 (0.47-1.07)
Leipzig [1]	23	45	0.51 (0.34-0.77)
Italy			
Udine and Pordenone [2]	27	29	0.95 (0.65-1.38)
Japan [3]	6,829	6,947	0.98 (0.96-1.01)
Netherlands [2]	624	588	1.06 (0.98-1.15)
New Zealand [2]	200	241	0.83 (0.72-0.95)
Poland [3]	1,933	1,932	1.00 (0.96-1.05)
South Korea [3]	4,727	4,778	0.99 (0.96-1.02)
Spain			
Las Palmas [2]	38	47	0.81 (0.59-1.11)
United States			
California [3]	1,344	1,429	0.94 (0.89-0.99)
Illinois (Cook County) [3]	149	180	0.83 (0.71-0.97)
Louisiana [2]	271	256	1.06 (0.94-1.19)
New Jersey [3]	257	217	1.18 (1.05-1.34)
Texas (4 counties) [2]	126	147	0.86 (0.72-1.02)
Puerto Rico [3,4]	57	42	1.34 (1.03-1.74)
Upper Middle Income Countries			
Brazil			
Botucatu [1]	6	3	1.87 (0.86-4.09)
Macelo [1]	12	14	0.80 (0.45-1.43)
Ecuador [3]	403	521	0.77 (0.70-0.85)
Mexico			
Mexico City [1]	191	199	0.96 (0.83-1.11)
Peru [3]	185	178	1.04 (0.90-1.20)
Russian Federation			
Saint Petersburg [2]	125	114	1.10 (0.92-1.31)



(1) Predictors for non-linear time trends and seasonality; (2) Predictors for linear time trends and seasonality; (3) Predictor for linear time trend only; (4) Unincorporated territory of the United States.