Data availability

This study used secondary data from SINAN and SIM that are publicly available at https://datasus.saude.gov.br/informacoes-de-saude-tabnet.

Population estimates were sourced from the Brazilian Institute of Geography and Statistics (IBGE): https://www.ibge.gov.br/estatisticas/sociais/populacao/9109-projecao-da-populacao.html

The codes will be available in the following GitHub directory: SuicideResearch/SINAN_SIM_COVID-19

http://doi.org/10.47626/1516-4446-2025-4454

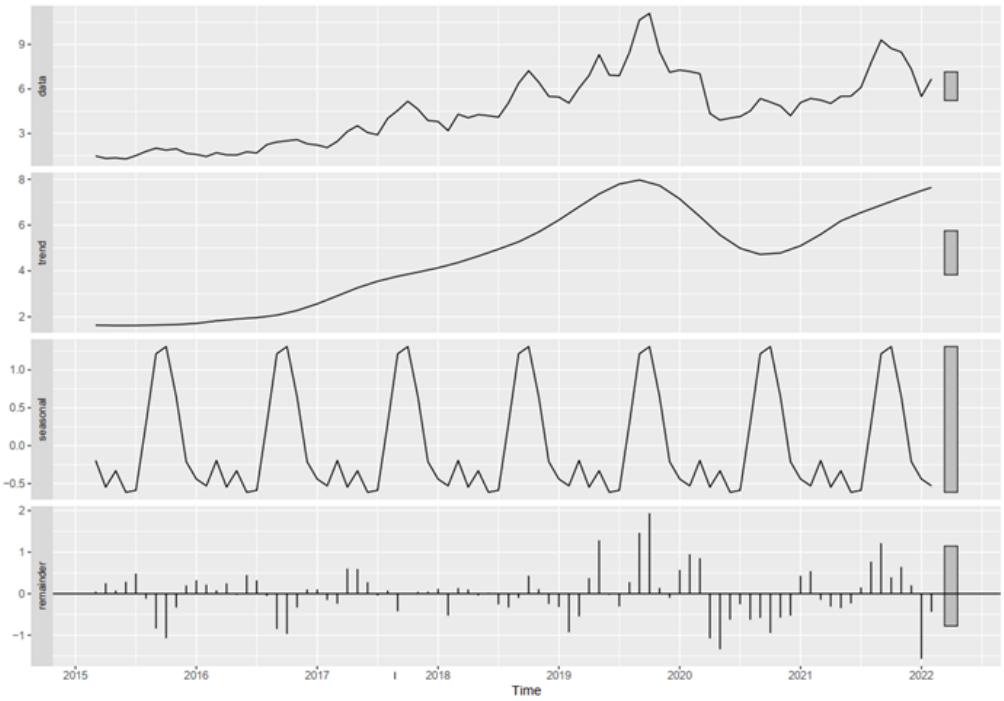
Supplementary Table S1 Distribution of self-harm notifications by recorded method before and during the COVID-19 pandemic

	Total n=176,458		Pre-pandemic n=113,767		Pandemic n=62,691	
	Notifications	**%**	**Notifications**	**%**	**Notifications**	**%**
Self-poisoning						
Yes	103,200	58.48	63,345	55.68	39,855	63.57
No	69,744	39.52	48,056	42.24	21,688	34.6
NR	3,514	1.99	2,366	2.08	1,148	1.83
Self-harm by sharp objects						
Yes	42,680	24.19	26,881	23.63	15,799	25.2
No	128,646	72.9	83,636	73.52	45,010	71.8
NR	5,132	2.91	3,250	2.86	1,882	3.0
Other methods						
Yes	22,541	12.77	17,643	15.51	4,898	7.81
No	146,809	83.2	91,456	80.39	55,353	88.29
NR	7,108	4.03	4,668	4.1	2,440	3.89
Hanging						
Yes	8,171	4.63	5,252	4.62	2,919	4.66
No	162,521	92.1	104,864	92.17	57,657	91.97
NR	5,766	3.27	3,651	3.21	2,115	3.37
Self-injury by bodily force or self-beating						
Yes	5,099	2.89	3,968	3.49	1,131	1.8
No	165,556	93.82	106,150	93.3	59,406	94.76
NR	5,803	3.29	3,649	3.21	2,154	3.44
Blunt objects						
Yes	3,407	1.93	2,180	1.92	1,227	1.96
No	167,069	94.68	107,787	94.74	59,282	94.56
NR	5,982	3.39	3,800	3.34	2,182	3.48
Hot objects						
Yes	1,377	0.78	947	0.83	430	0.69
No	169,186	95.88	109,089	95.89	60,097	95.86
NR	5,795	3.28	3,731	3.28	2,164	3.45
Firearms						
Yes	894	0.51	674	0.59	220	0.35
No	169,631	96.13	109,333	96.1	60,298	96.18
NR	5,933	3.36	3,760	3.31	2,173	3.47

NR = method not reported.
Percentages are calculated within each period. Methods are not mutually exclusive; more than one method of self-harm could be recorded for the same notification.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S1 Seasonal trend decomposition of monthly self-harm notification rates time series – Overall



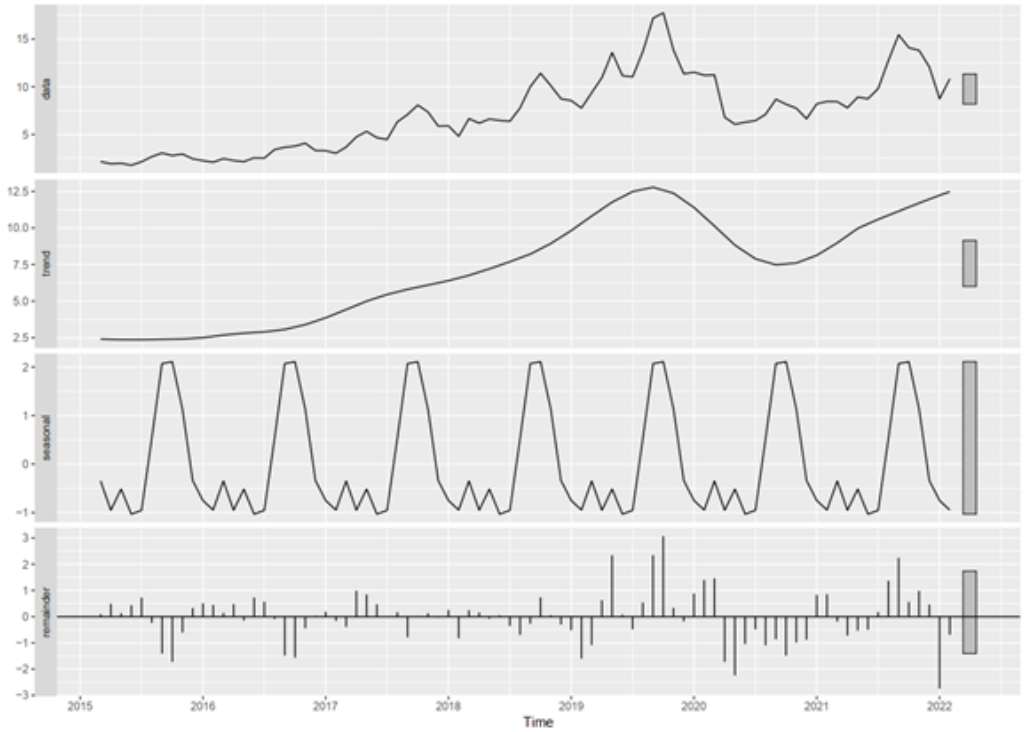
Supplementary Figure S2 ACF and PACF diagnostics for monthly self-harm notification rates time series – Overall



ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S3 Seasonal trend decomposition of monthly self-harm notification rates time series – Female



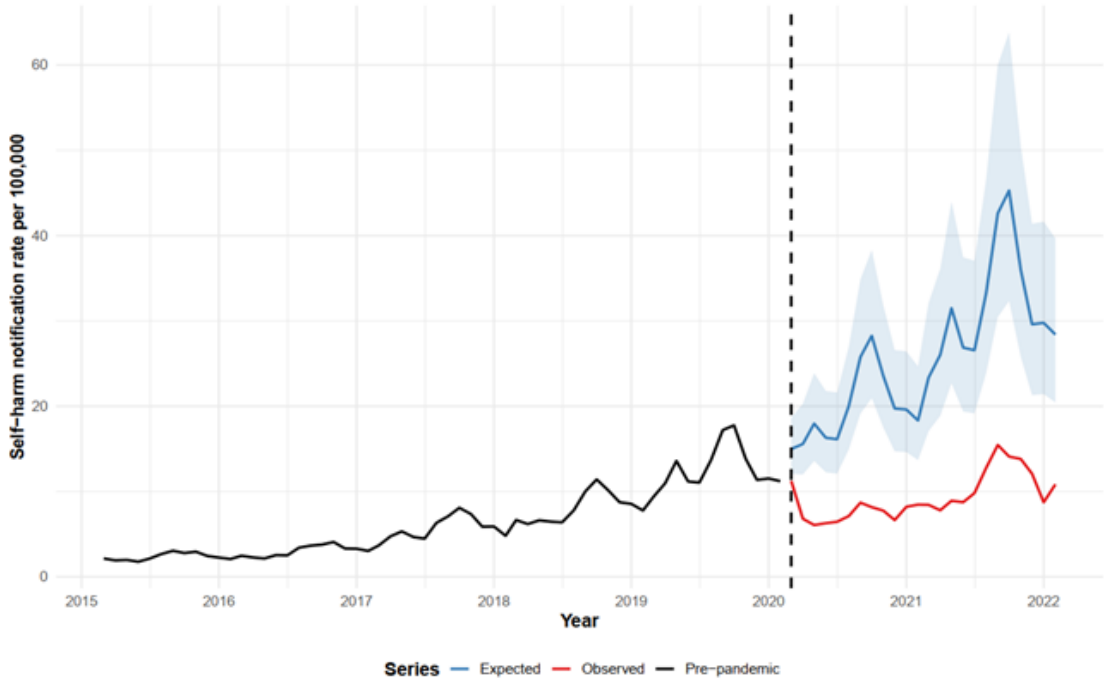
Supplementary Figure S4 ACF and PACF diagnostics for monthly self-harm notification rates time series – Female



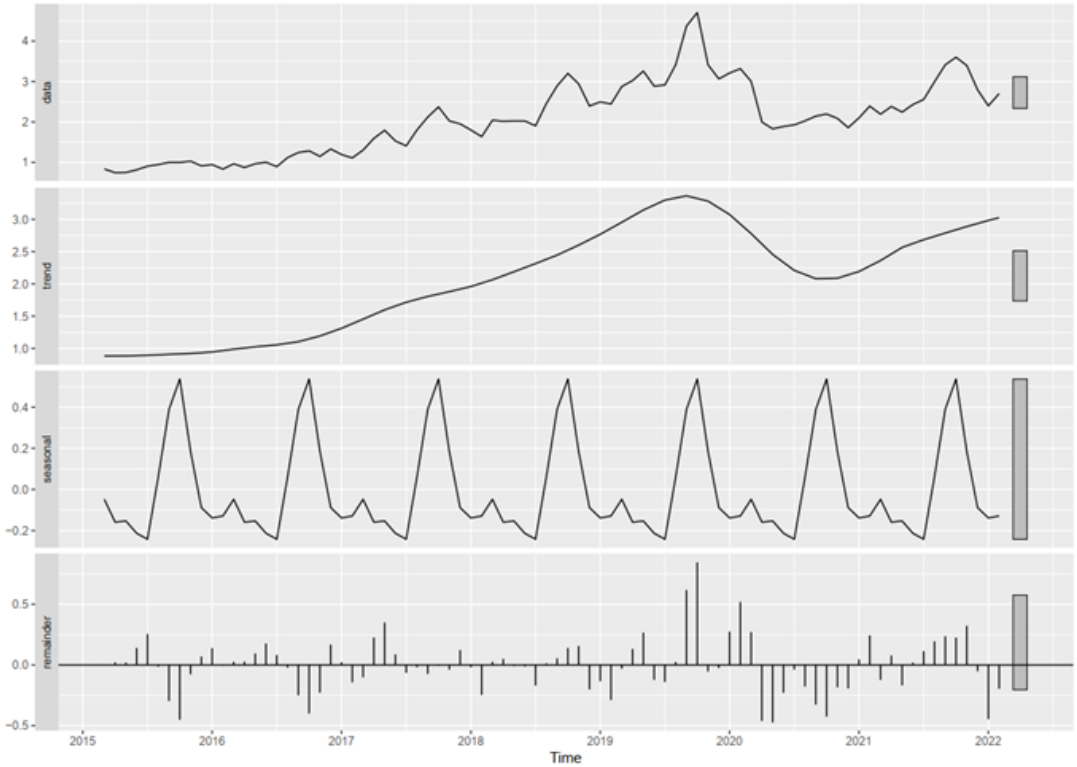
ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S5 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – Female

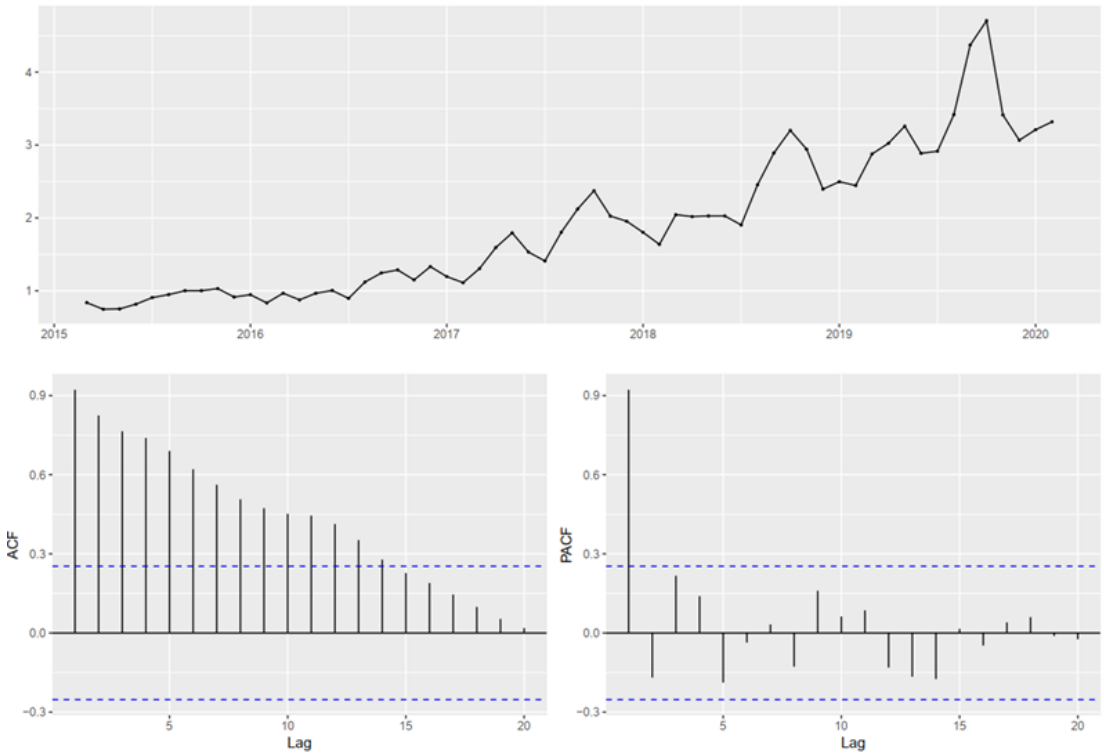


Supplementary Figure S6 Seasonal trend decomposition of monthly self-harm notification rates time series – Male



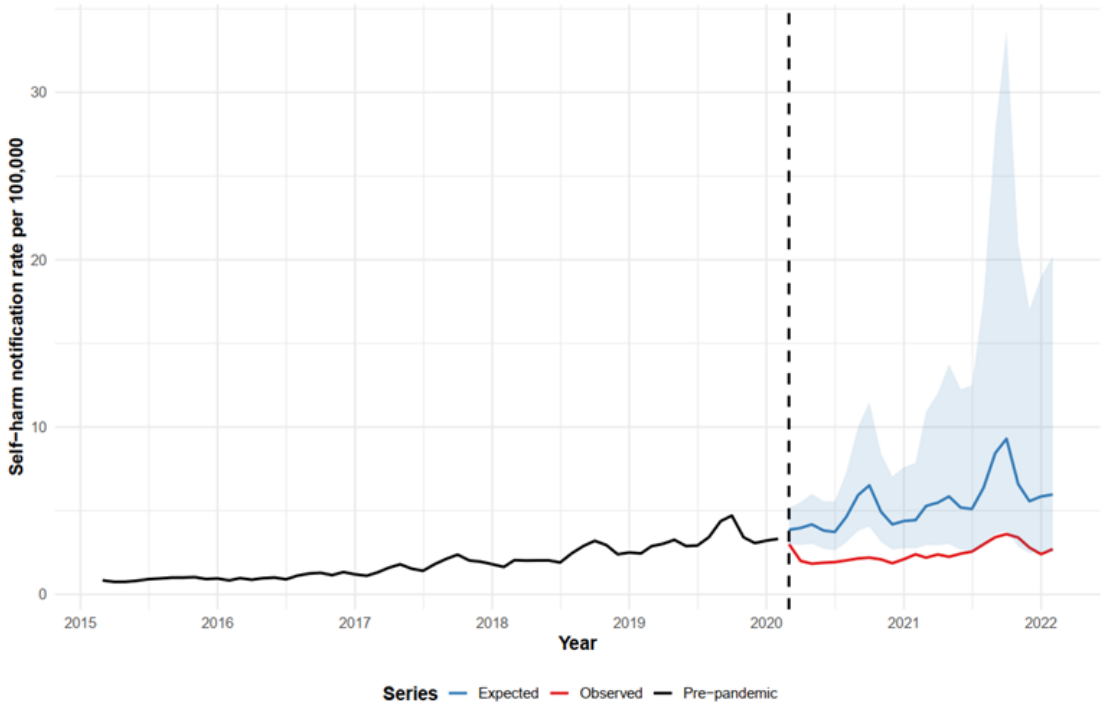
http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S7 ACF and PACF diagnostics for monthly self-harm notification rates time series – Male



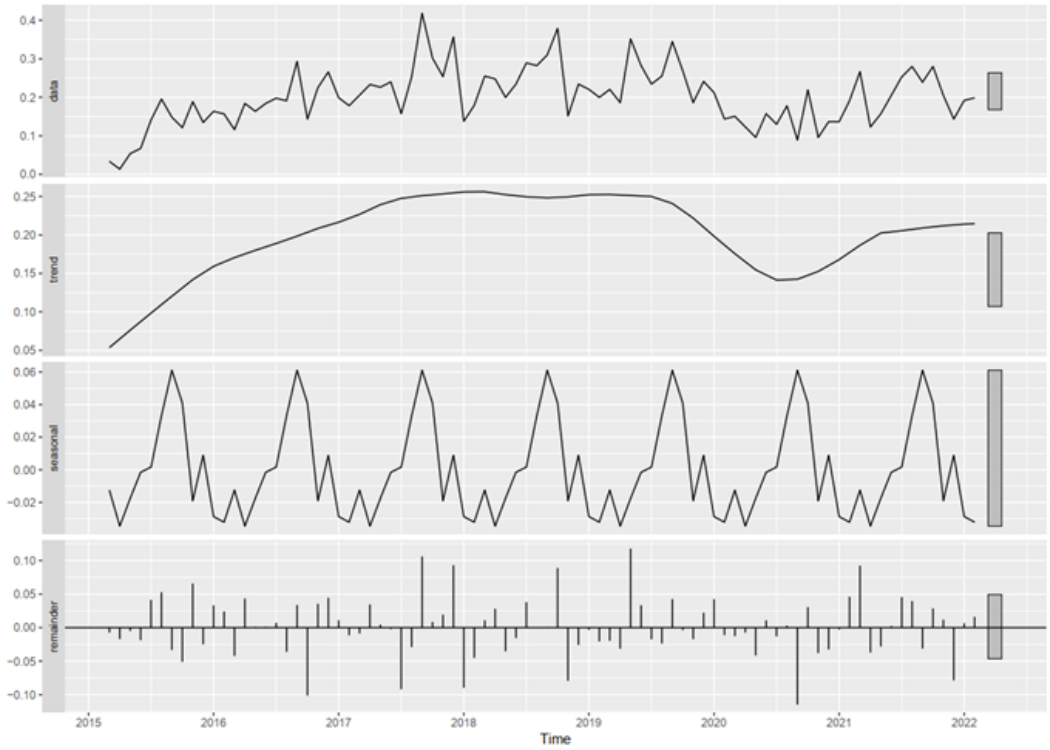
ACF = autocorrelation; PACF = partial autocorrelation.

Supplementary Figure S8 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – Male

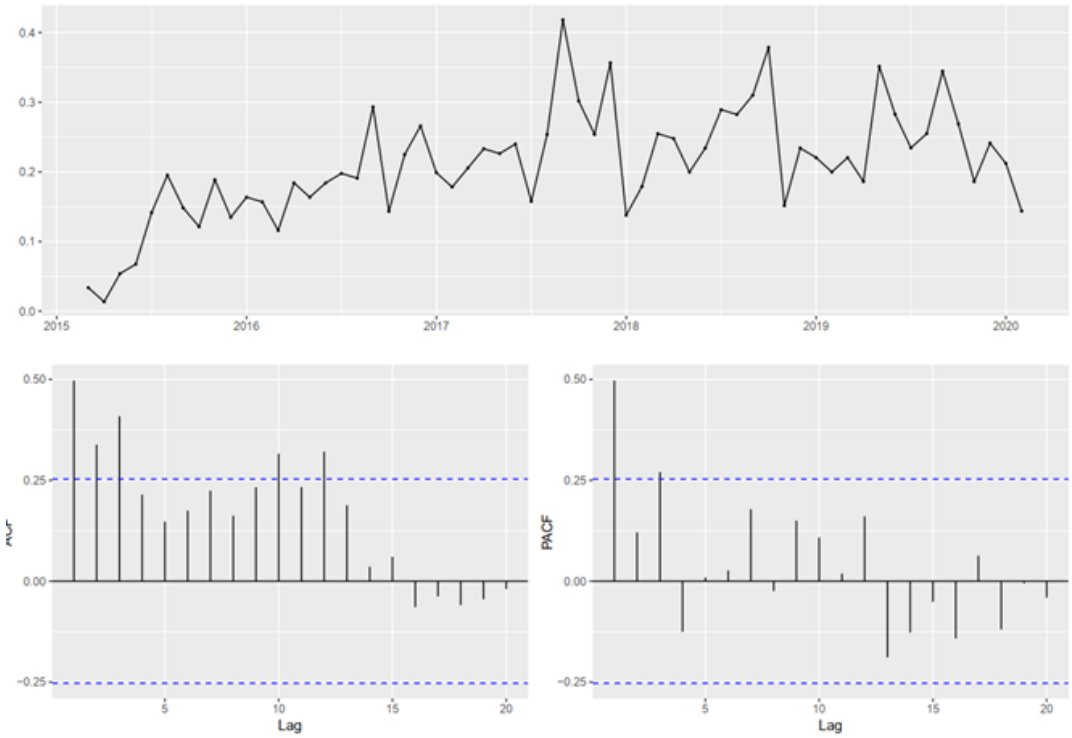


http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S9 Seasonal trend decomposition of monthly self-harm notification rates time series – 05 to 09 years



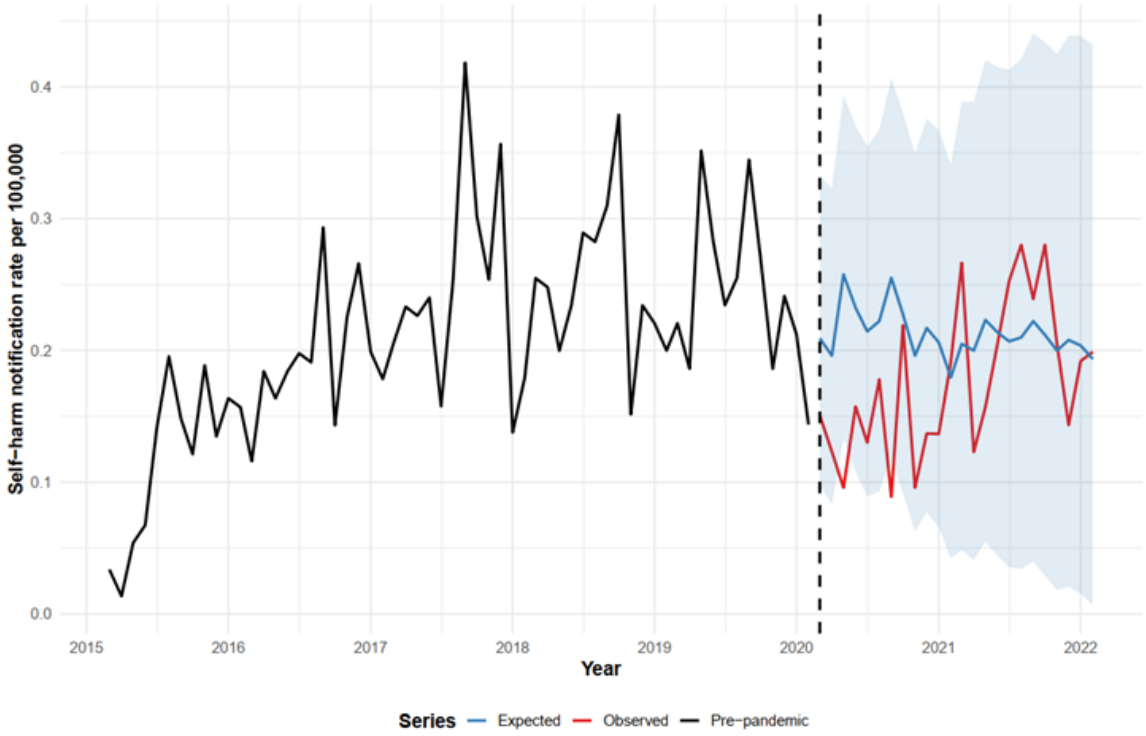
Supplementary Figure S10 ACF and PACF diagnostics for monthly self-harm notification rates time series – 05 to 09 years



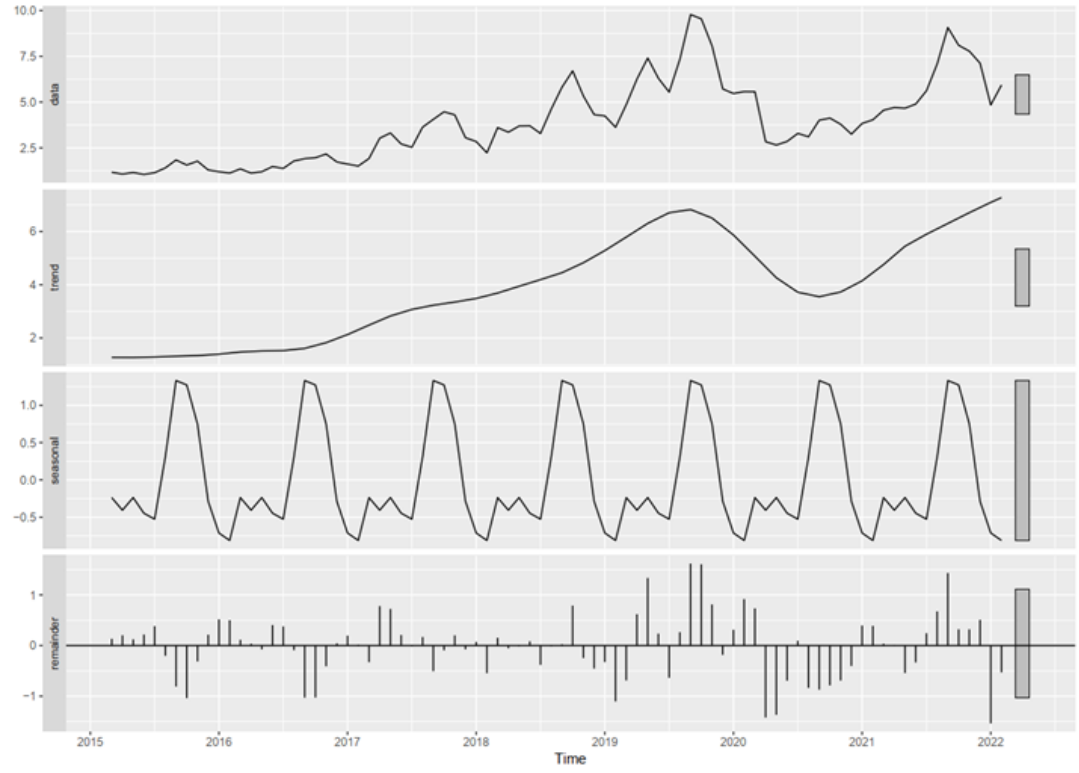
ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S11 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – 05 to 09 years

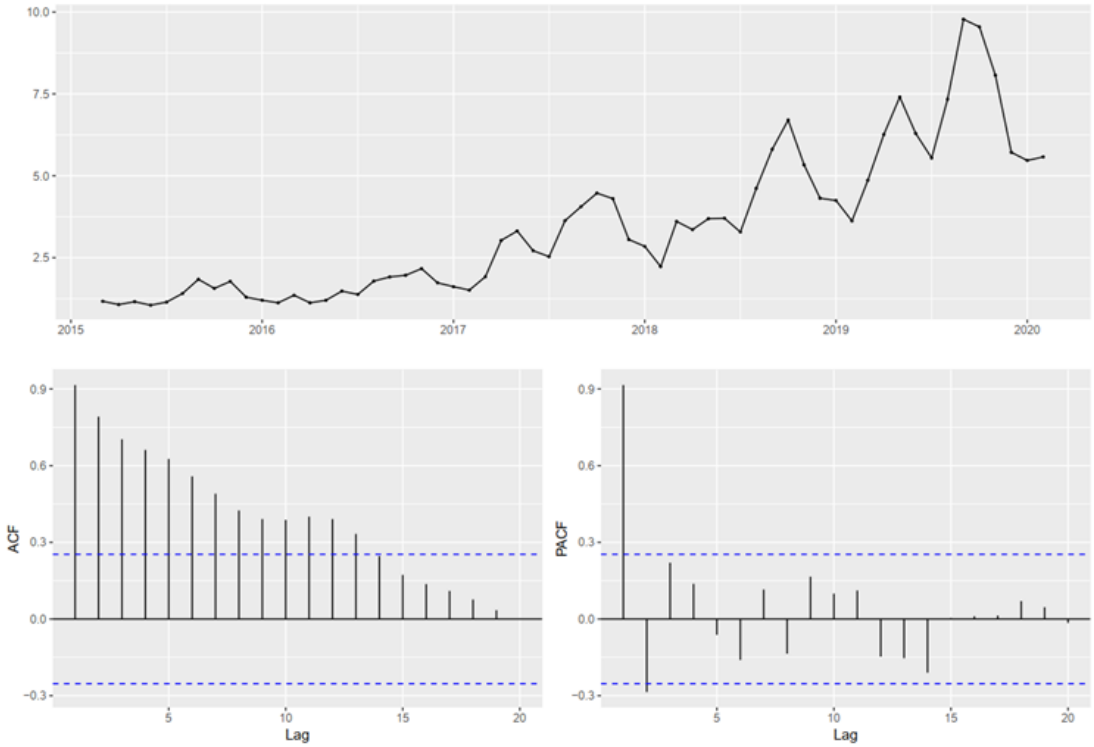


Supplementary Figure S12 Seasonal trend decomposition of monthly self-harm notification rates time series – 10 to 14 years

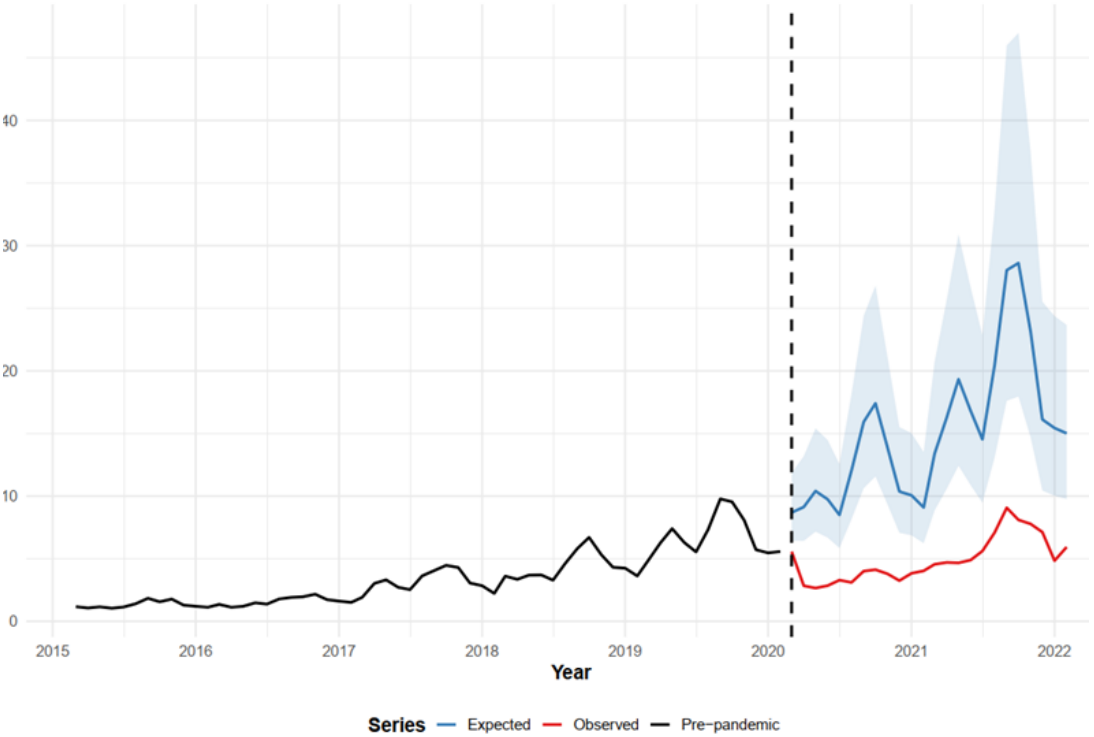


http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S13 ACF and PACF diagnostics for monthly self-harm notification rates time series – 10 to 14 years

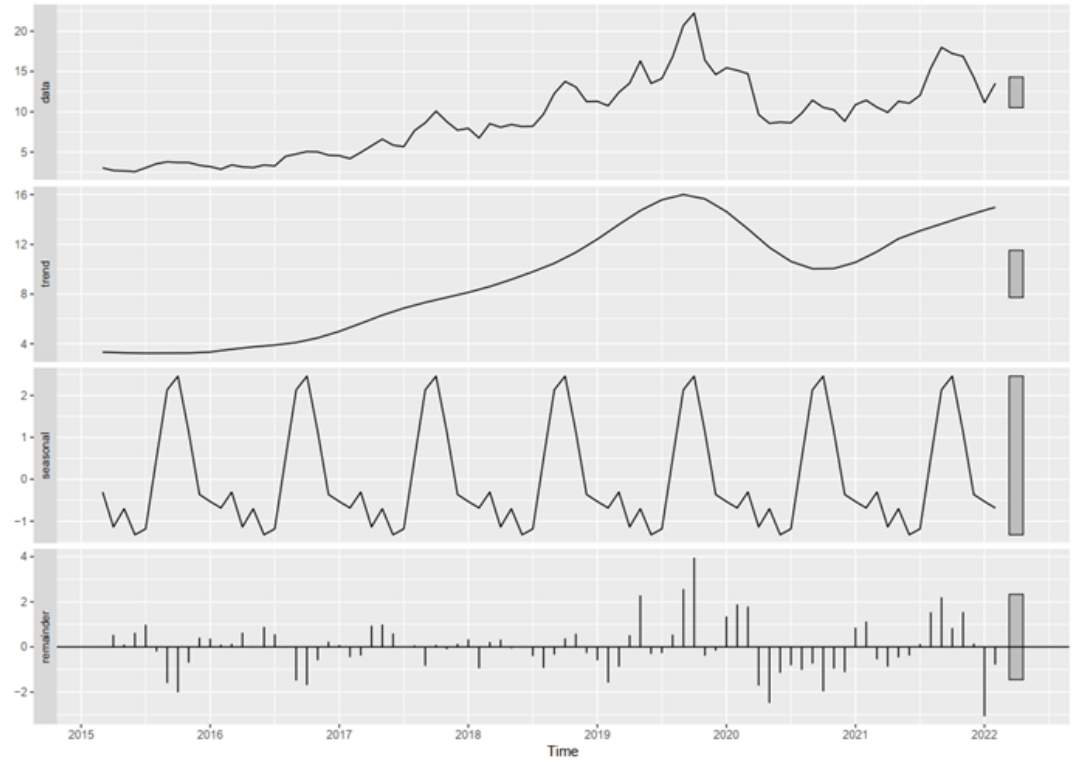


Supplementary Figure S14 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – 10 to 14 years

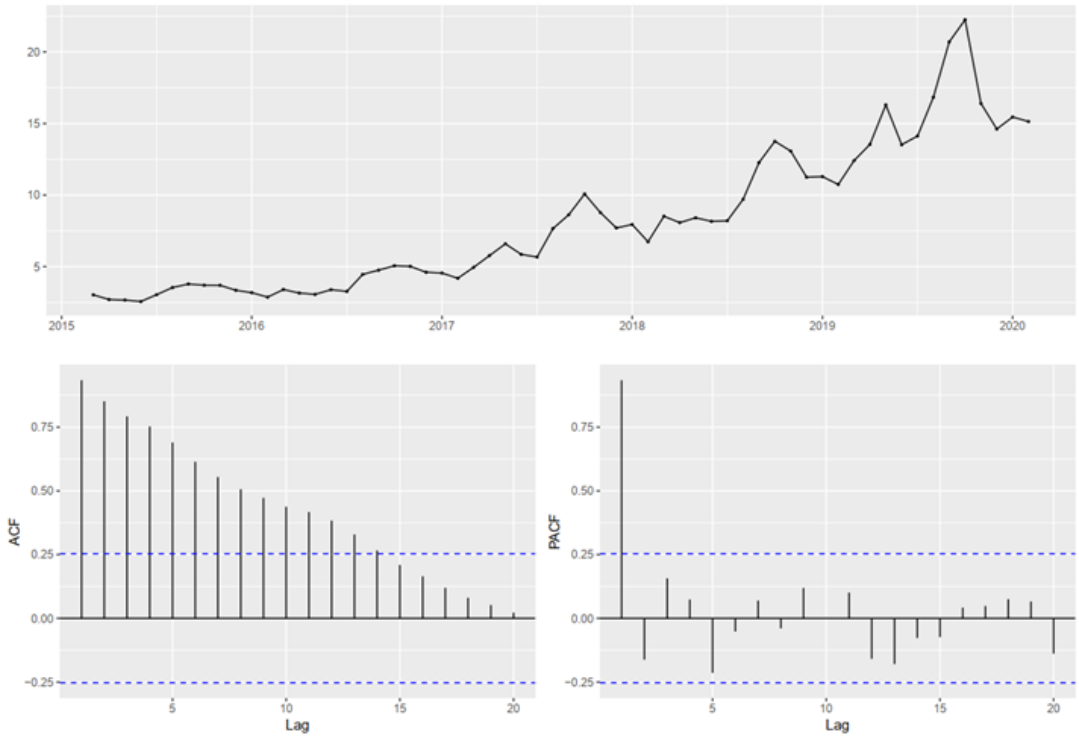


http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S15 Seasonal trend decomposition of monthly self-harm notification rates time series – 15 to 19 years



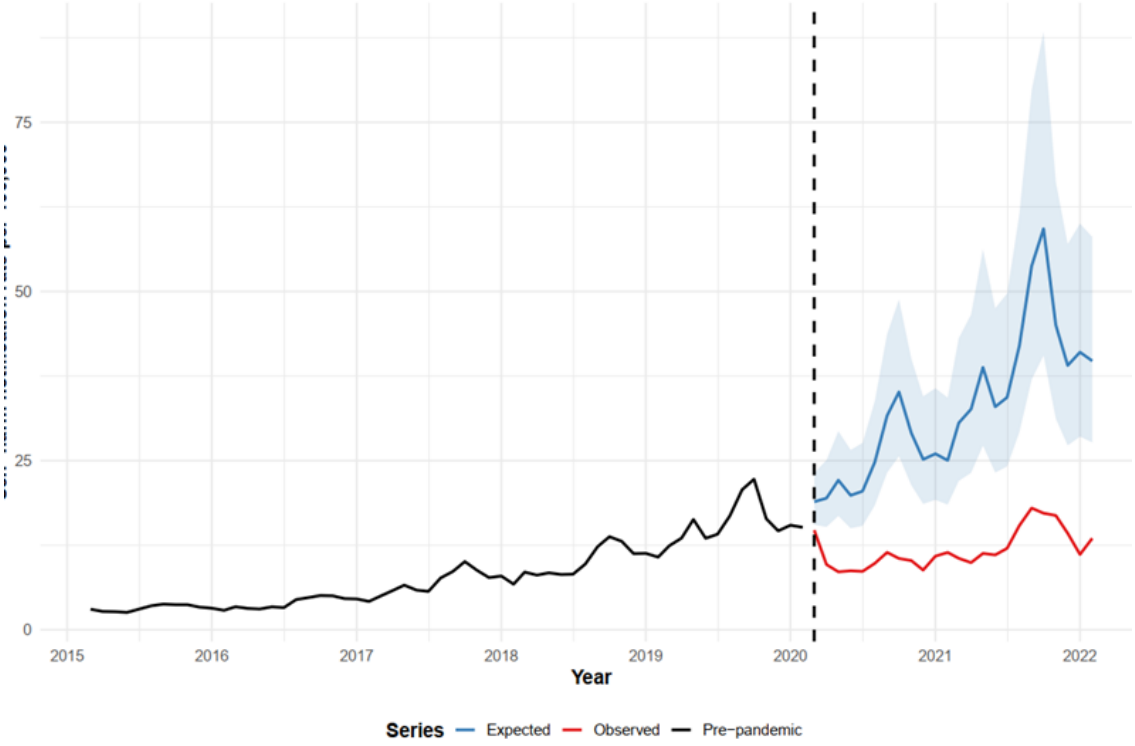
Supplementary Figure S16 ACF and PACF diagnostics for monthly self-harm notification rates time series – 15 to 19 years



ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S17 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – 15 to 19 years



http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Table S2 Metrics of ARIMA/SARIMA models – Self-harm notification rates

					After differencing		Ljung–Box test		Metrics – training			Metrics – testing			Information criteria		
	Model	λ	ADF	p	ADF	p	χ^2	p	MAE	RMSE	MAPE	MAE	RMSE	MAPE	AIC	AICc	BIC
Overall sample	(1,0,0)(1,1,0)[12]	-0.1259	-2.51	0.3699	-5.64	<0.01	22.95	0.3465	0.70	0.40	5.75	10.62	11.40	183.01	-95.07	-94.14	-87.58
Female	(1,0,0)(1,1,0)[12]	-0.0558	-2.47	0.384	-5.58	<0.01	28.39	0.1295	0.47	0.68	6.62	16.33	17.42	177.23	-78.83	-77.9	-71.35
Male	(1,0,1)(1,1,0)[12]	-0.331	-2.4	0.4157	-5.67	<0.01	29.07	0.1124	0.12	0.20	6.09	2.96	3.13	122.06	-85.1	-84.17	-77.61
05 to 09 years	(0,1,1)(1,0,0)[12]	0.8236	-3.29	0.0824	-4.99	<0.01	14.98	0.863	0.04	0.06	23.89	0.06	0.07	44.90	-124.68	-124.24	-118.44
10 to 14 years	(1,0,0)(1,1,0)[12]	-0.129	-2.67	0.3044	-5.93	<0.01	23.36	0.3249	0.30	0.47	7.73	10.19	11.03	214.63	-58.08	-57.15	-50.6
15 to 19 years	(1,0,0)(1,1,0)[12]	-0.130	-2.46	0.3894	-5.85	<0.01	18.74	0.6015	0.49	0.79	5.38	20.92	22.57	175.33	-110.21	-109.28	-102.73
Central-West	(2,1,1)(1,1,0)[12]	-0.2631	-2.26	0.4708	-6.19	<0.01	21.92	0.3449	0.45	0.68	9.11	23.30	27.63	301.87	-65.38	-63.92	-56.13
North	(0,1,1)(1,0,0)[12]	-0.0811	-2.54	0.3583	-5.07	<0.01	19.96	0.5857	0.32	0.45	0.75	1.28	1.47	63.61	0.78	1.21	7.01
Northeast	(0,1,1)(0,1,1)[12]	-0.1166	-2.03	0.5628	-5.12	<0.01	23.74	0.3609	0.22	0.34	10.36	6.74	7.41	196.09	-13.78	-13.22	-8.22
South	(1,0,0)(1,1,0)[12]	0.0731	-2.92	0.2047	-5.56	<0.01	21.49	0.4293	0.68	1.00	7.85	17.88	18.89	185.33	-34.73	-33.8	-27.25
Southeast	(0,0,1)(0,1,1)[12]	-0.061	-2.9	0.2114	-6.45	<0.01	12.02	0.6477	0.04	0.59	7.14	9.98	10.17	147.61	-72.53	-71.6	-65.04

ADF = augmented Dickey–Fuller test; AIC = Akaike information criterion; AICc = corrected Akaike information criterion; BIC = Bayesian information criterion; MAE = mean absolute error; MAPE = mean absolute percentage error; RMSE = root mean squared error.

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Supplementary Table S3 Metrics of ARIMA/SARIMA models – Self-harm notifications

					After differencing		Ljung–Box test		Metrics – training			Metrics – testing			Information criteria		
	Model	λ	ADF	p	ADF	p	χ^2	p	MAE	RMSE	MAPE	MAE	RMSE	MAPE	AIC	AICc	BIC
Overall sample	(1,0,0)(1,1,0)[12]	-0.1295	-2.55	0.3512	-5.59	0.01	23.19	0.3337	124.48	184.55	5.96	4720.79	5063.23	180.86	-171.88	-170.88	-164.39
Female	(1,0,0)(1,1,0)[12]	-0.0573	-2.52	0.3645	-5.52	0.01	28.45	0.1279	106.53	153.34	6.75	3552.07	3784.56	175.29	-108.95	-108.02	-101.46
Male	(1,0,1)(1,1,0)[12]	-0.3434	-2.89	0.2156	-5.6	0.01	29.28	-2.89	46.1	6.4	675.89	715.41	121.1	46.1	-266.11	-265.18	-258.62
05 to 09 years	(0,1,1)(1,0,0)[12]	0.8402	-3.35	0.0728	-4.98	0.01	15.07	-3.35	8.62	23.83	8.72	10.71	44.81	8.62	366.28	366.71	372.51
10 to 14 years	(1,0,0,)(1,1,0)[12]	-0.1341	-2.73	0.2815	83	0.01	23.5	-2.73	71.92	7.89	1480.86	1600	212.29	71.92	-123.49	-122.56	-116
15 to 19 years	(1,0,0)(1,1,0)[12]	-0.1375	-2.55	0.3515	-5.81	0.01	18.68	-2.55	129.77	5.54	3295.52	3549.88	175.88	129.77	-179.19	-178.26	-171.71
Central-West	(2,1,1)(1,1,0)[12]	-0.2621	-2.26	0.4696	-6.17	0.01	21.88	0.3474	16.33	24.79	9.15	839.72	994.79	298.99	-153.97	-152.5	-144.72
North	(0,1,1)(1,0,0)[12]	-0.0887	-2.57	0.3434	-5.06	0.01	20.16	0.5733	15.91	22.27	17.61	63.47	72.56	64.31	-40.41	-39.97	-34.17
Northeast	(0,1,1)(0,1,1)[12]	-0.1214	-2.11	0.5294	-5.1	0.01	24.07	0.3435	29.43	45.51	10.41	869.58	954.23	194.87	-70.1	-69.54	-64.55
South	(1,0,0)(1,1,0)[12]	0.0756	-2.94	0.1957	-5.53	0.01	21.26	0.4434	41.64	61.03	7.89	1061.53	1120.44	183.05	-4.5	-3.57	2.98
Southeast	(0,0,1)(0,1,1)[12]	-0.0631	-2.97	0.1836	-6.4	0.01	18.98	0.5864	71.43	105.21	7.27	1672.87	1755.71	145.77	-104.3	-103.37	-96.82

ADF = augmented Dickey–Fuller test; AIC = Akaike information criterion; AICc = corrected Akaike information criterion; BIC = Bayesian information criterion; MAE = mean absolute error; MAPE = mean absolute percentage error; RMSE = root mean squared error.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Table S4 SARIMAX intervention estimates for the onset of the COVID-19 pandemic on self-harm notification rates

Intervention month/sample	Model	β	SE	p	AICc
February 2020					
Overall sample	(1,0,0)(1,1,0)[12]	-0.01	0.09	0.902	-103.92
Female	(1,0,0)(1,1,0)[12]	-0.02	0.10	0.8448	-80.19
Male	(1,0,1)(1,1,0)[12]	-0.002	0.08	0.9835	-110.74
05 to 09 years	(0,1,1)(1,0,0)[12]	-0.16	0.05	0.0015	-182.32
10 to 14 years	(1,0,0)(1,1,0)[12]	0.04	0.12	0.7454	-50.74
15 to 19 years	(1,0,0)(1,1,0)[12]	-0.02	0.07	0.7885	-128.23
March 2020					
Overall sample	(1,0,0)(1,1,0)[12]	-0.16	0.10	0.1041	-106.53
Female	(1,0,0)(1,1,0)[12]	-0.17	0.12	0.1386	-81.33
Male	(1,0,1)(1,1,0)[12]	-0.26	0.11	0.0225	-115.35
05 to 09 years	(0,1,1)(1,0,0)[12]	-0.13	0.05	0.0178	-179.22
10 to 14 years	(1,0,0)(1,1,0)[12]	-0.29	0.14	0.0427	-54.67
15 to 19 years	(1,0,0)(1,1,0)[12]	-0.10	0.08	0.2137	-129.71
April 2020					
Overall sample	(1,0,0)(1,1,0)[12]	-0.37	0.09	<0.0001	-119.77
Female	(1,0,0)(1,1,0)[12]	-0.41	0.10	0.0001	-93.65
Male	(1,0,1)(1,1,0)[12]	-0.42	0.07	<0.0001	-132.85
05 to 09 years	(0,1,1)(1,0,0)[12]	-0.09	0.06	0.1329	-176.9
10 to 14 years	(1,0,0)(1,1,0)[12]	-0.57	0.13	<0.0001	-67.99
15 to 19 years	(1,0,0)(1,1,0)[12]	-0.28	0.07	0.0002	-140.81

AICc = corrected Akaike information criterion; SE = standard error.

Results from SARIMAX intervention analyses evaluating the immediate effects of the COVID-19 pandemic onset on monthly self-harm notification rates, overall and stratified by sex and age group. Three different months were included to investigate the effect: February, March, and April 2020.

Regression coefficients (β) represent the estimated relative change in the outcome following each intervention month.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Table S5 SARIMAX intervention estimates for the onset of the COVID-19 pandemic on self-harm notifications

Intervention month/sample	Model	β	SE	p	AICc
February 2020					
Overall sample	(1,0,0)(1,1,0)[12]	-0.01	0.04	0.8978	-219.06
Female	(1,0,0)(1,1,0)[12]	-0.01	0.07	0.8417	-125.36
Male	(1,0,1)(1,1,0)[12]	-0.0004	0.01	0.9768	-382.09
05 to 09 years	(0,1,1)(1,0,0)[12]	-10.07	3.19	0.0016	508.41
10 to 14 years	(1,0,0)(1,1,0)[12]	0.02	0.06	0.7537	-148.89
15 to 19 years	(1,0,0)(1,1,0)[12]	-0.01	0.04	0.7831	-231.33
March 2020					
Overall sample	(1,0,0)(1,1,0)[12]	-0.07	0.04	0.1036	-221.67
Female	(1,0,0)(1,1,0)[12]	-0.13	0.09	0.1378	-127.51
Male	(1,0,1)(1,1,0)[12]	-0.04	0.02	0.0234	-386.68
05 to 09 years	(0,1,1)(1,0,0)[12]	-8.20	3.45	0.0175	511.45
10 to 14 years	(1,0,0)(1,1,0)[12]	-0.15	0.07	0.0419	-152.87
15 to 19 years	(1,0,0)(1,1,0)[12]	-0.05	0.04	0.2114	-232.81
April 2020					
Overall sample	(1,0,0)(1,1,0)[12]	-0.17	0.04	<0.0001	-234.95
Female	(1,0,0)(1,1,0)[12]	-0.30	0.08	0.0001	-138.83
Male	(1,0,1)(1,1,0)[12]	-0.06	0.01	<0.0001	-404.30
05 to 09 years	(0,1,1)(1,0,0)[12]	-5.66	3.75	0.1316	513.70
10 to 14 years	(1,0,0)(1,1,0)[12]	-0.29	0.06	<0.0001	-166.26
15 to 19 years	(1,0,0)(1,1,0)[12]	-0.14	0.04	0.0002	-243.93

AICc = corrected Akaike information criterion; SE = standard error.
Results from SARIMAX intervention analyses evaluating the immediate effects of the COVID-19 pandemic onset on monthly self-harm notifications, overall and stratified by sex and age group. Three different months were included to investigate the effect: February, March, and April 2020. Regression coefficients (β) represent the estimated relative change in the outcome following each intervention month.

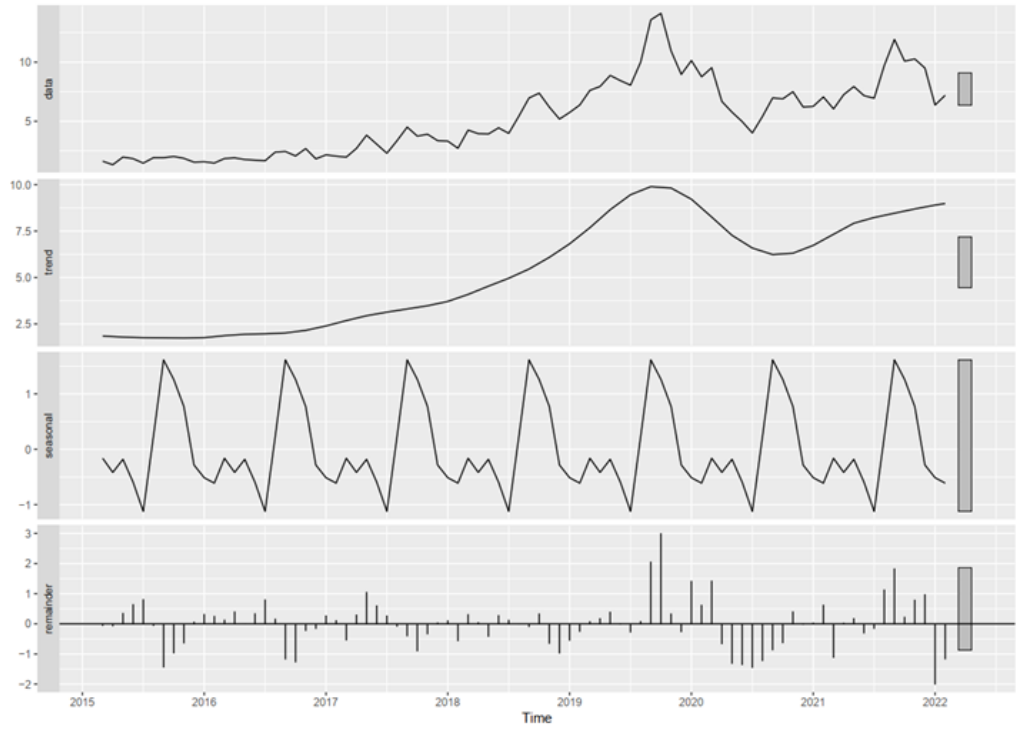
Supplementary Table S6 Interrupted time-series regression estimates of immediate and trend changes in monthly self-harm notification rates associated with the onset of the COVID-19 pandemic

	February			March			April		
Sample/parameter	**β**	**SE**	**p**	**β**	**SE**	**p**	**β**	**SE**	**p**
Overall sample									
Intercept	–	–	–	–	–	–	0.47	0.62	0.4492
Pre-intervention trend	–	–	–	–	–	–	0.12	0.02	<0.0001
Immediate level change (COVID-19 onset)	–	–	–	–	–	–	-3.21	0.71	<0.0001
Change in post-intervention trend	–	–	–	–	–	–	0.001	0.06	0.9886
Female									
Intercept	–	–	–	–	–	–	0.45	1.03	0.6643
Pre-intervention trend	–	–	–	–	–	–	0.19	0.03	<0.0001
Immediate level change (COVID-19 onset)	–	–	–	–	–	–	-5.3	1.2	<0.0001
Change in post-intervention trend	–	–	–	–	–	–	0.02	0.11	0.8806
Male									
Intercept	–	–	–	0.5	0.25	0.0478	0.45	0.2	0.029
Pre-intervention trend	–	–	–	0.04	0.01	<0.0001	0.04	0.01	<0.0001
Immediate level change (COVID-19 onset)	–	–	–	-0.71	0.29	0.0178	-1.29	0.26	<0.0001
Change in post-intervention trend	–	–	–	-0.04	0.02	0.1357	-0.01	0.02	0.6274
05 to 09 years									
Intercept	0.13	0.02	<0.0001	0.13	0.02	<0.0001	0.14	0.02	<0.0001
Pre-intervention trend	0.003	0.001	<0.0001	0.002	0.001	0.0001	0.002	0.001	0.0004
Immediate level change (COVID-19 onset)	-0.17	0.03	<0.0001	-0.15	0.04	0.0001	-0.14	0.04	0.0006
Change in post-intervention trend	0.001	0.002	0.5659	0.001	0.002	0.5577	0.002	0.003	0.5131
10 to 14 years									
Intercept	–	–	–	0.59	0.82	0.4774	0.34	0.63	0.5878
Pre-intervention trend	–	–	–	0.09	0.02	0.0002	0.1	0.02	<0.0001
Immediate level change (COVID-19 onset)	–	–	–	-1	0.86	0.2477	-3.37	0.76	<0.0001
Change in post-intervention trend	–	–	–	-0.04	0.08	0.6064	0.06	0.06	0.3923
15 to 19 years									
Intercept	–	–	–	–	–	–	0.76	1.14	0.5082
Pre-intervention trend	–	–	–	–	–	–	0.24	0.03	<0.0001
Immediate level change (COVID-19 onset)	–	–	–	–	–	–	-6.02	1.36	<0.0001
Change in post-intervention trend	–	–	–	–	–	–	-0.03	0.11	0.7936

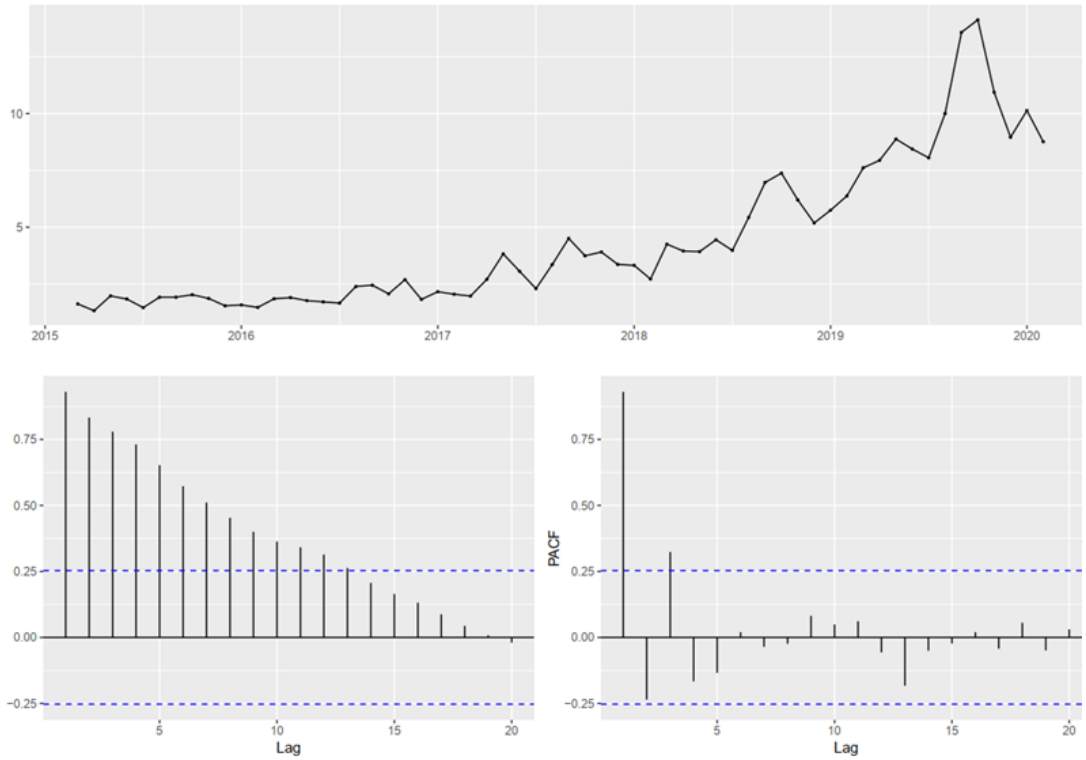
SE = standard error.
Interrupted time-series regression models were fitted to monthly self-harm notification rates to estimate pre-intervention trends, immediate level changes following the onset of the COVID-19 pandemic, and changes in post-intervention trends. For each subgroup, the intervention month shown corresponds to the model with the best fit or strongest evidence of effect, based on sensitivity analyses.
Regression coefficients (β) represent absolute changes in self-harm notification rates.

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Supplementary Figure S18 Seasonal trend decomposition of monthly self-harm notification rate time series – Central-West



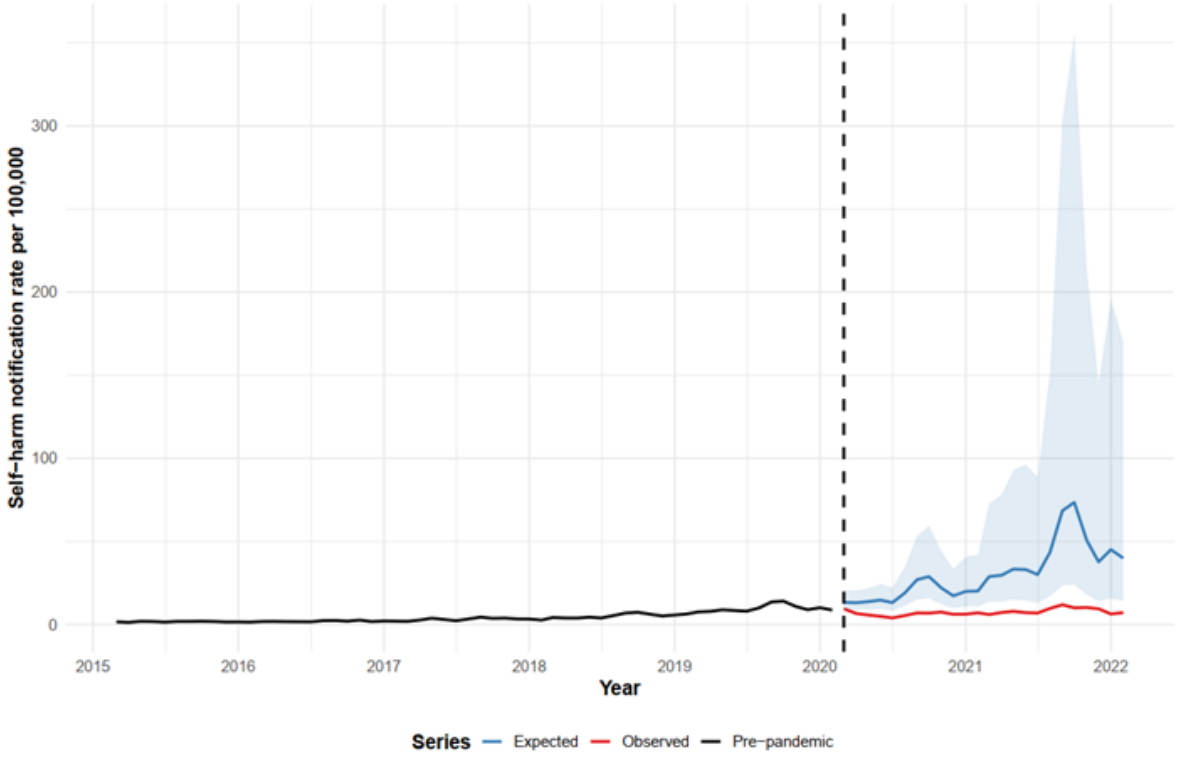
Supplementary Figure S19 ACF and PACF diagnostics for monthly self-harm notification rate time series – Central-West



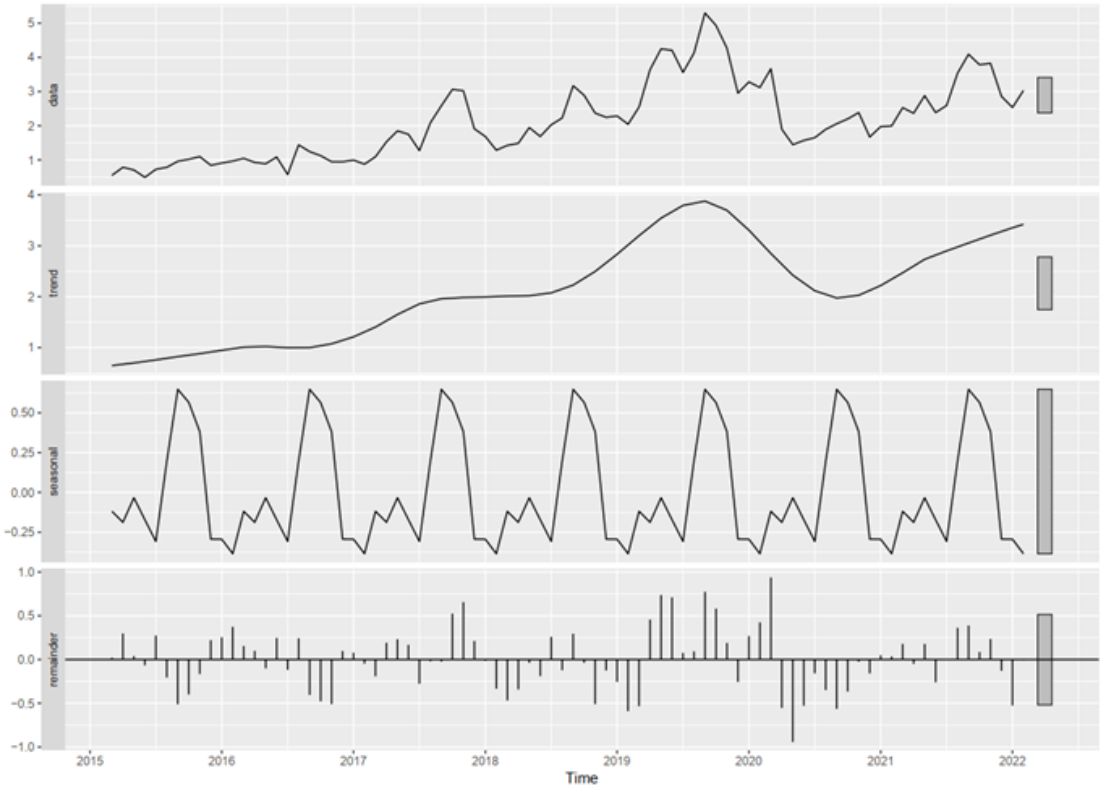
ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

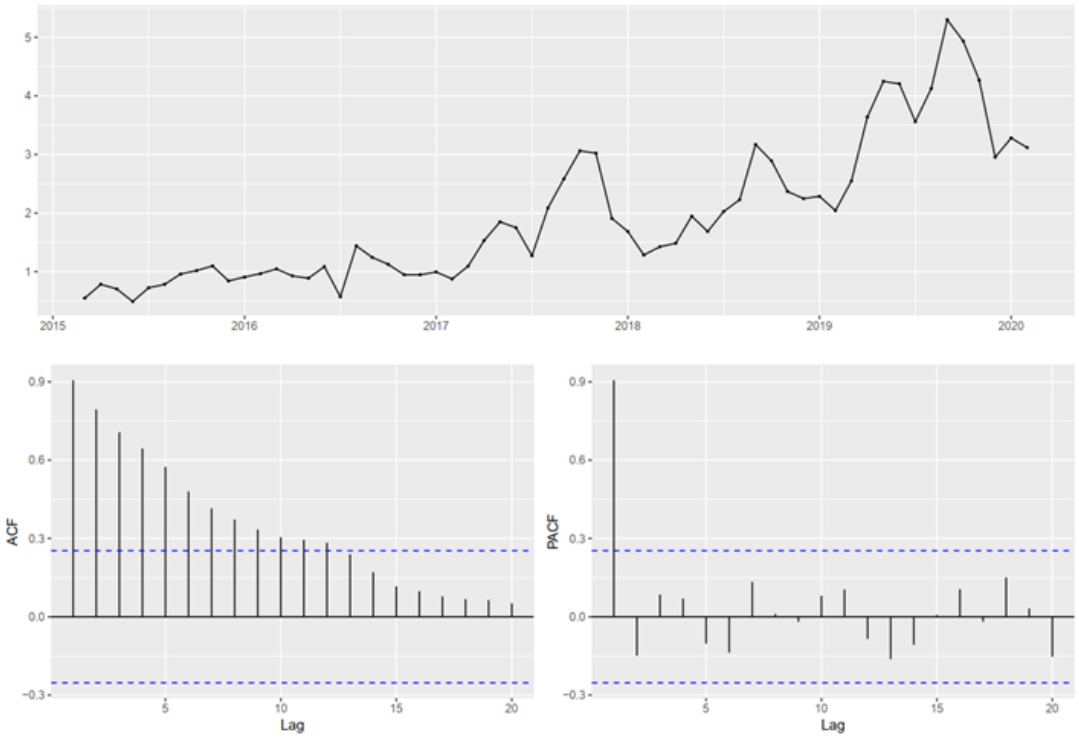
Supplementary Figure S20 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – Central-West



Supplementary Figure S21 Seasonal trend decomposition of monthly self-harm notification rate time series – North

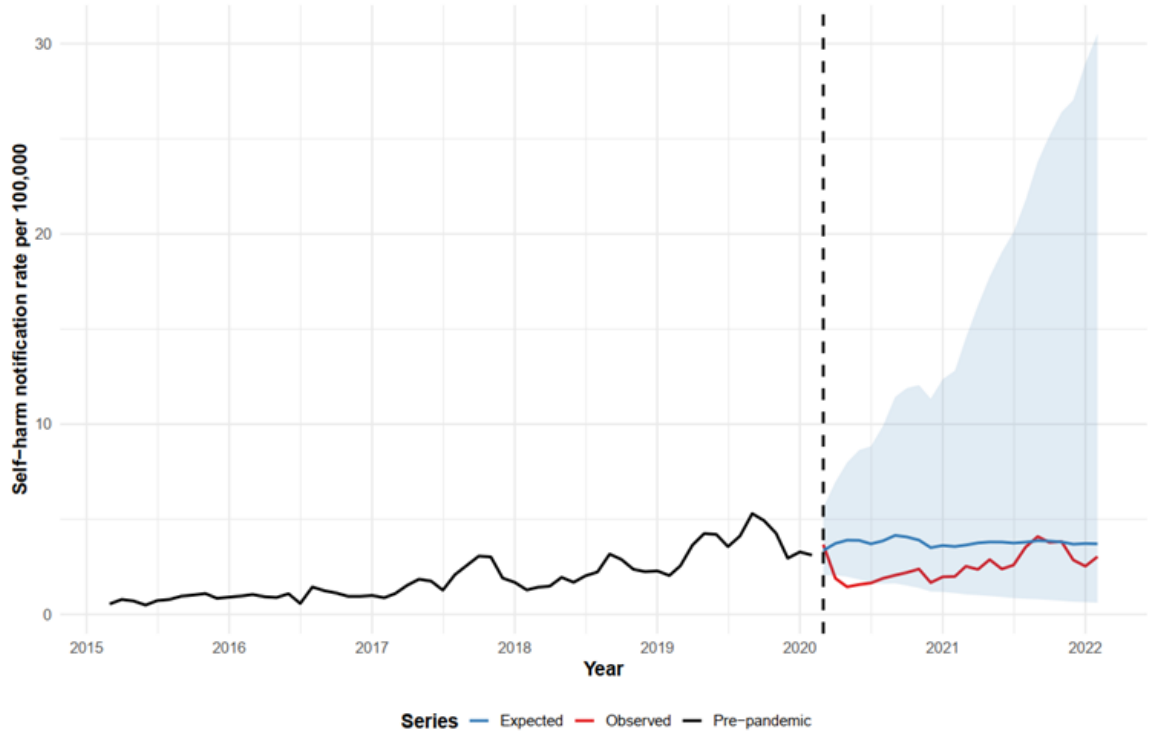


Supplementary Figure S22 ACF and PACF diagnostics for monthly self-harm notification rate time series – North



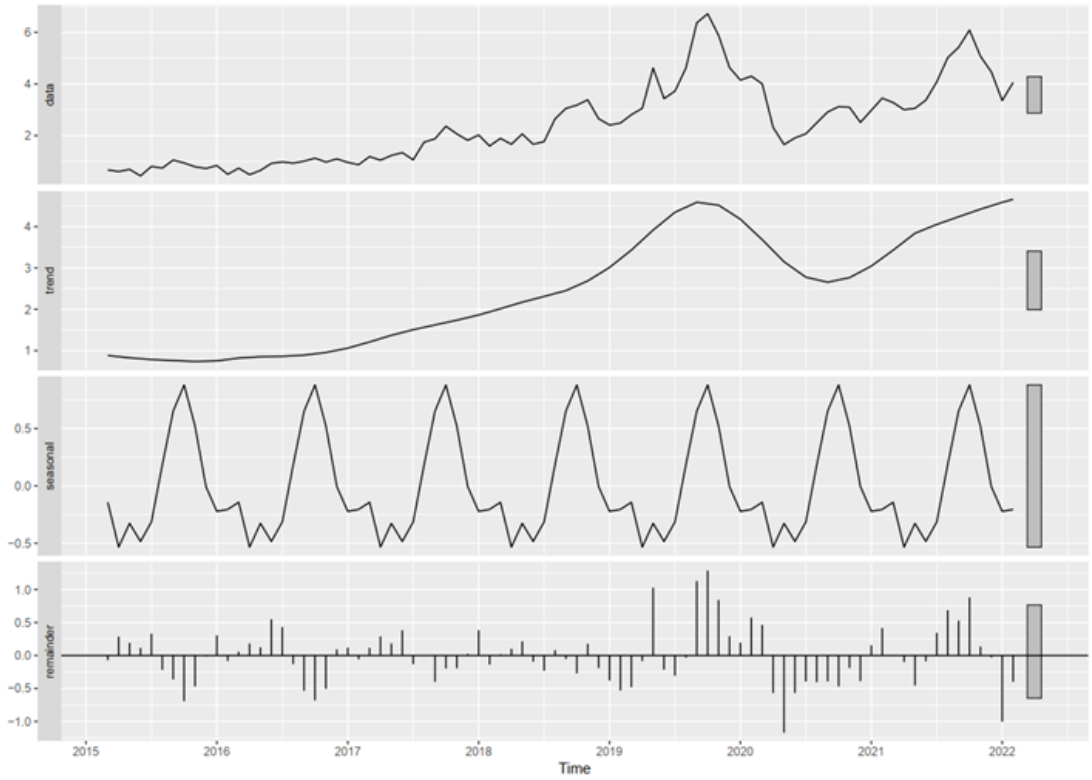
ACF = autocorrelation; PACF = partial autocorrelation.

Supplementary Figure S23 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – North

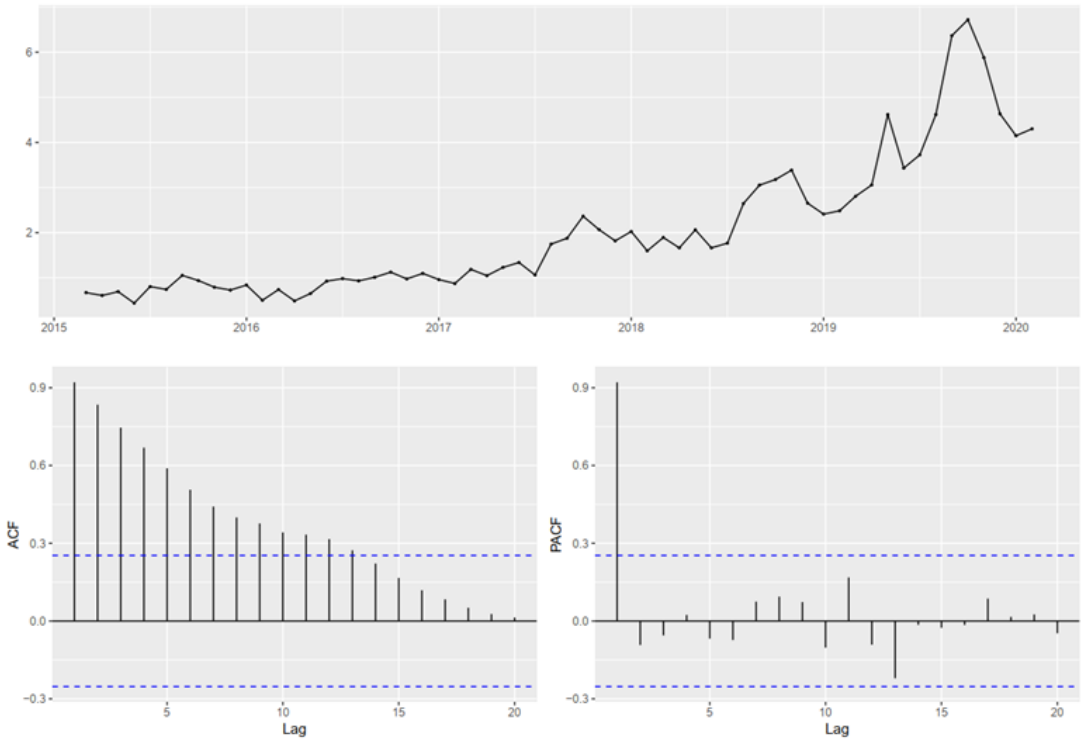


http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S24 Seasonal trend decomposition of monthly self-harm notification rate time series – Northeast



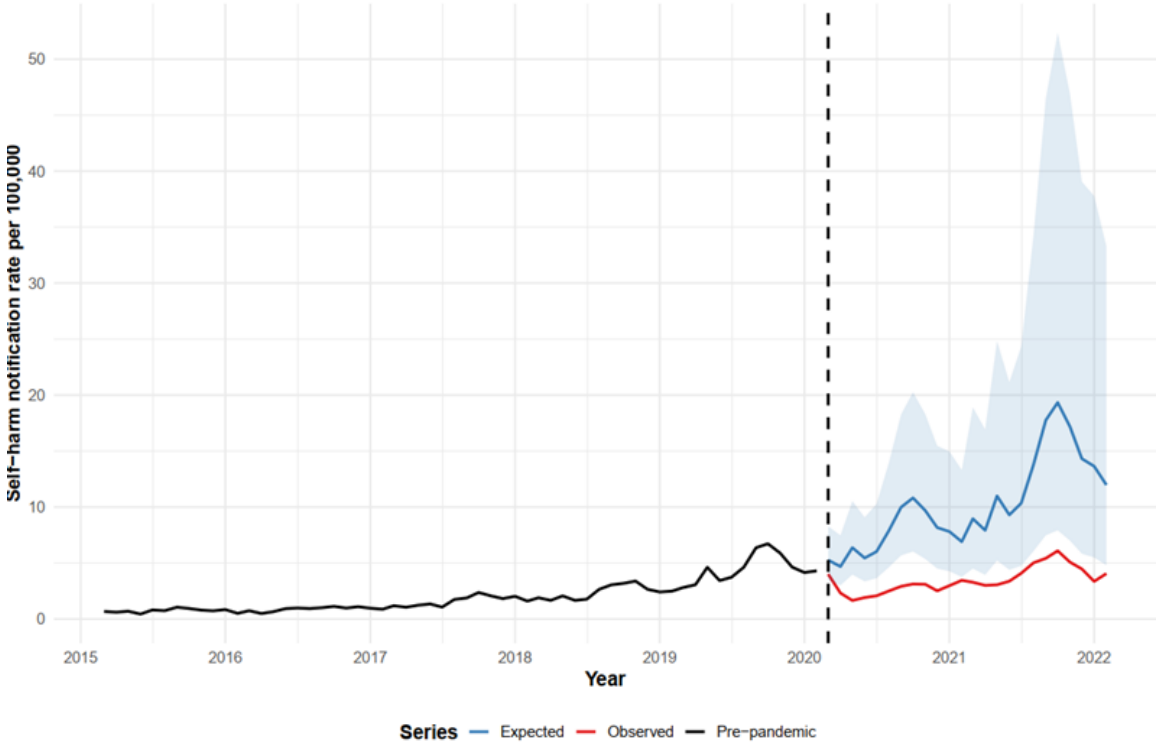
Supplementary Figure S25 ACF and PACF diagnostics for monthly self-harm notification rate time series – Northeast



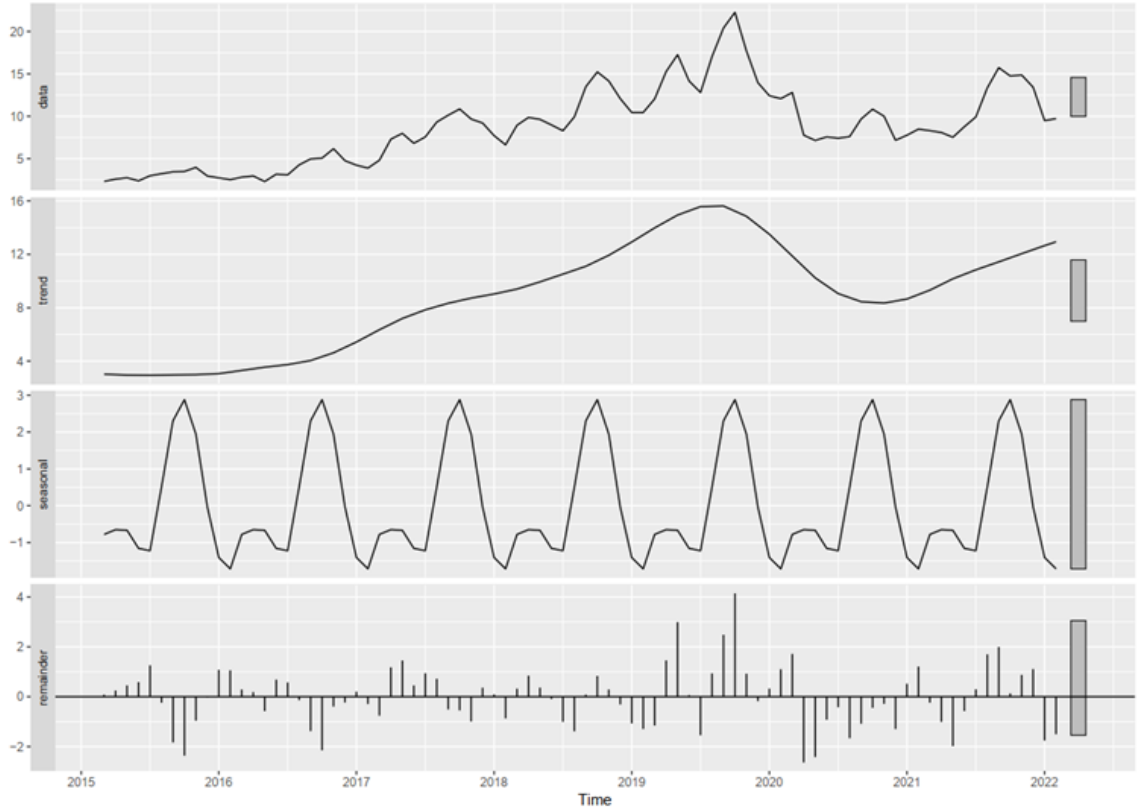
ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S26 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – Northeast

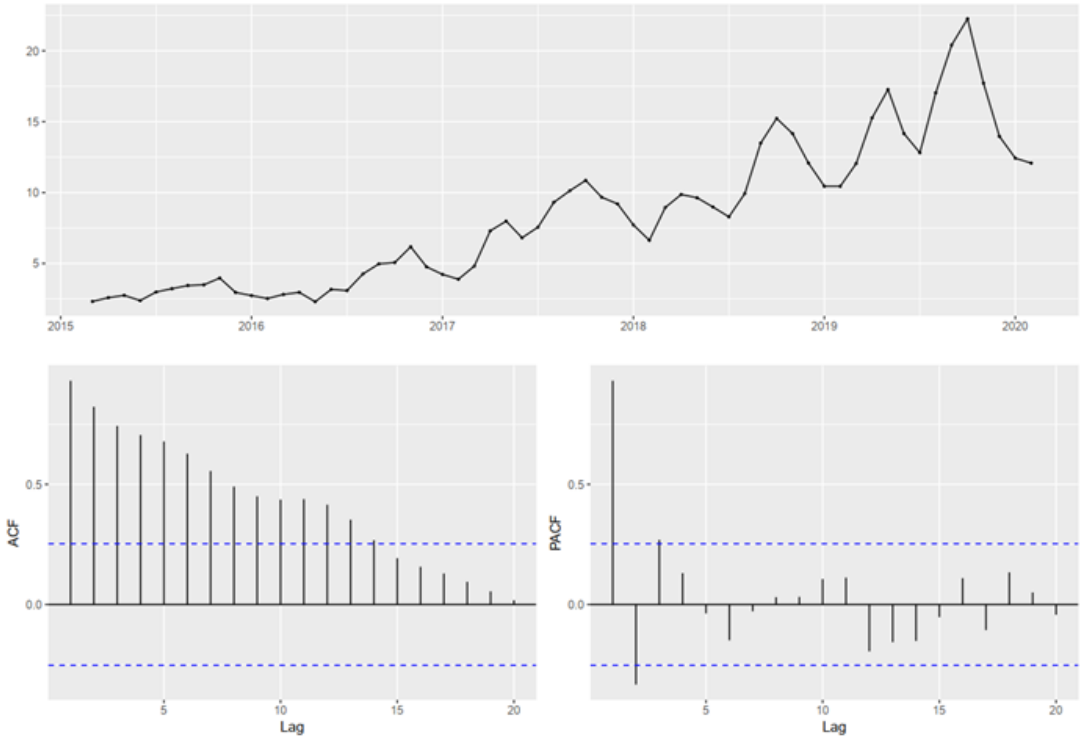


Supplementary Figure S27 Seasonal trend decomposition of monthly self-harm notification rate time series – South



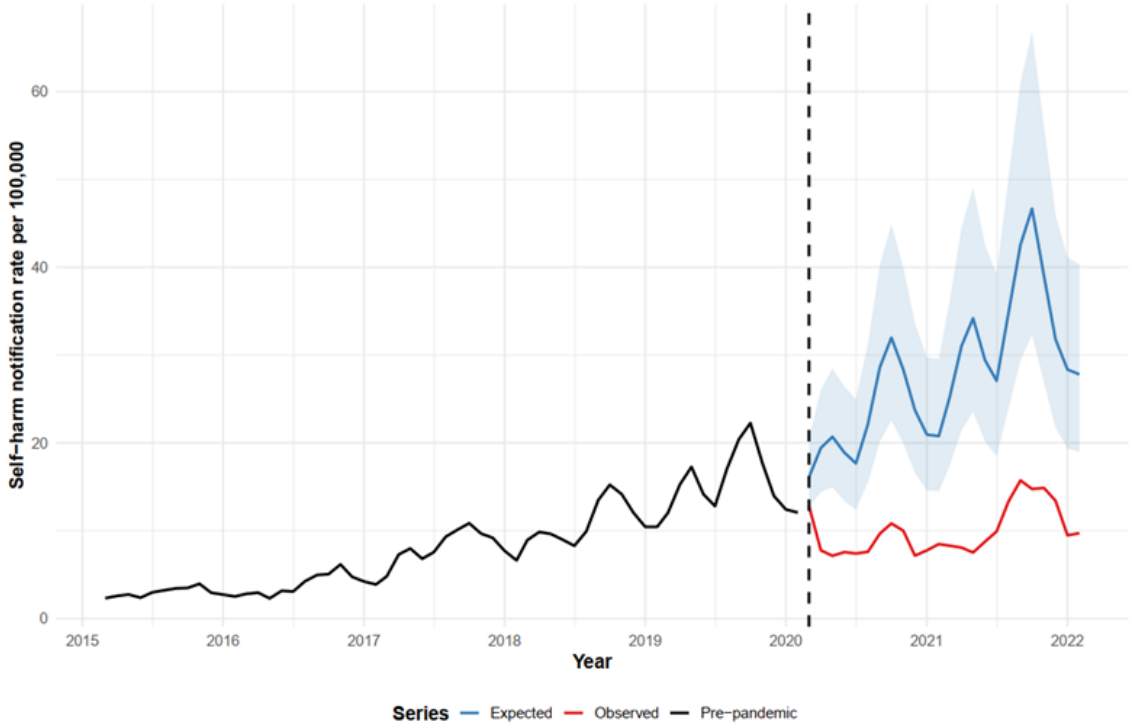
http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S28 ACF and PACF diagnostics for monthly self-harm notification rate time series – South



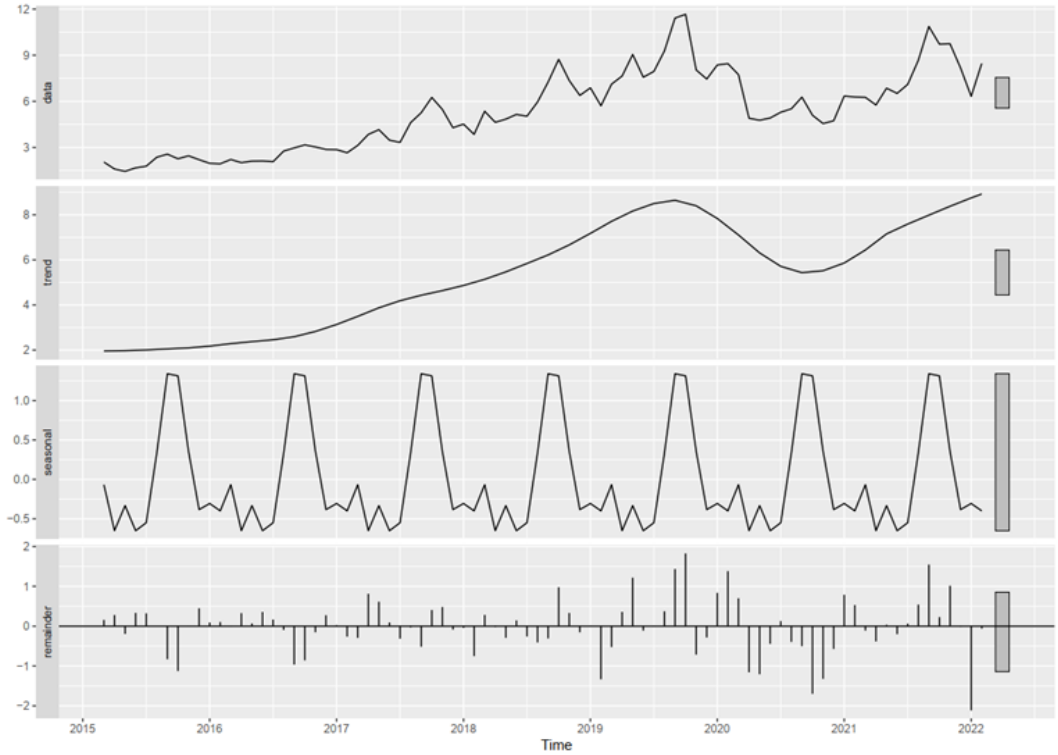
ACF = autocorrelation; PACF = partial autocorrelation.

Supplementary Figure S29 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – South



http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S30 Seasonal trend decomposition of monthly self-harm notification rate time series – Southeast



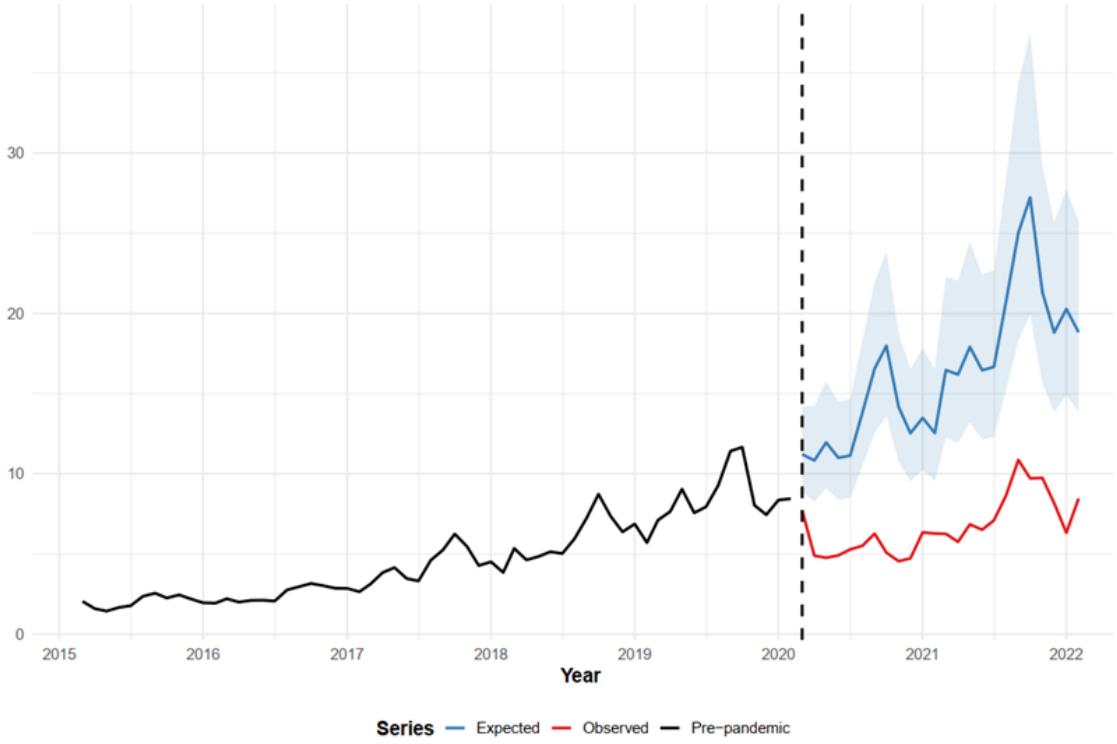
Supplementary Figure S31 ACF and PACF diagnostics for monthly self-harm notification rate time series – Southeast



ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S32 Observed and counterfactual expected self-harm notification rates with 95% prediction intervals – Southeast



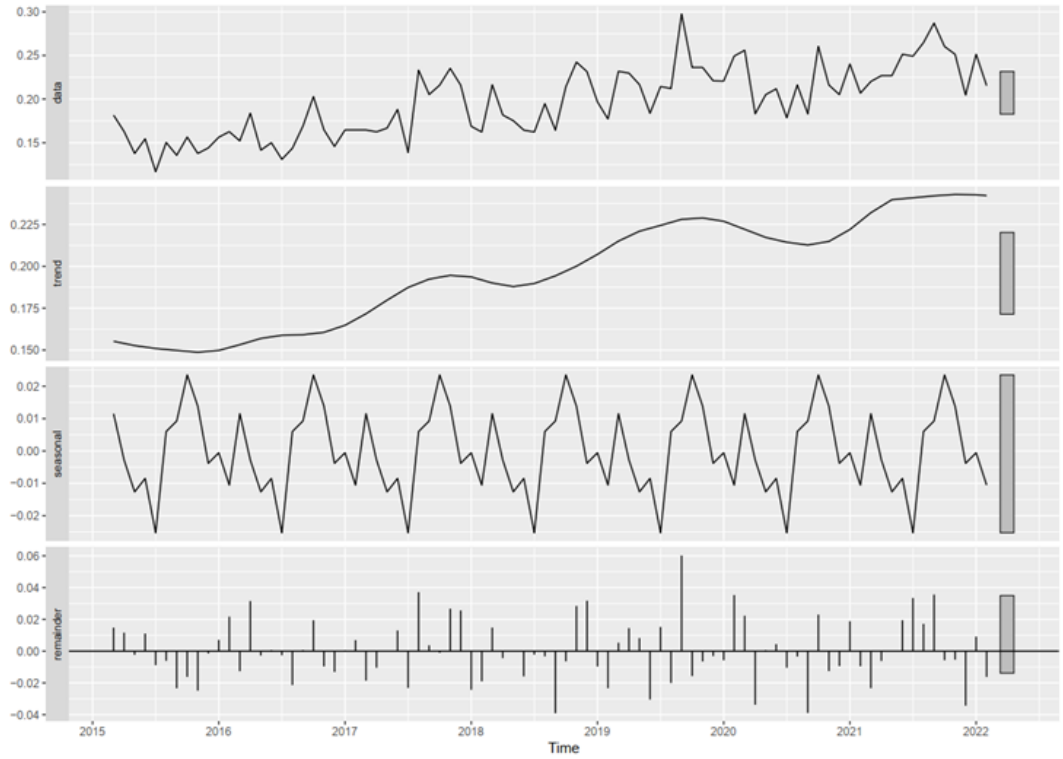
Supplementary Table S7 Distribution of suicide deaths by method before and during the COVID-19 pandemic

	Total n=7609		Pre-pandemic n=5143		Pandemic n=2466	
Method	**Notifications**	**%**	**Notifications**	**%**	**Notifications**	**%**
Hanging, strangulation, and suffocation	5743	75.48	3873	75.31	1870	75.83
Firearm	468	6.15	313	6.09	155	6.29
Jumping from a high place	281	3.69	202	3.93	79	3.20
Self-poisoning by drugs/medications	370	4.86	221	4.30	149	6.04
Self-poisoning by exposure to pesticides	199	2.62	158	3.07	41	1.66
Other specified methods	215	2.83	152	2.96	63	2.55
Self-poisoning – others	137	1.8	101	1.96	36	1.46
Unspecified methods	116	1.52	84	1.63	32	1.30

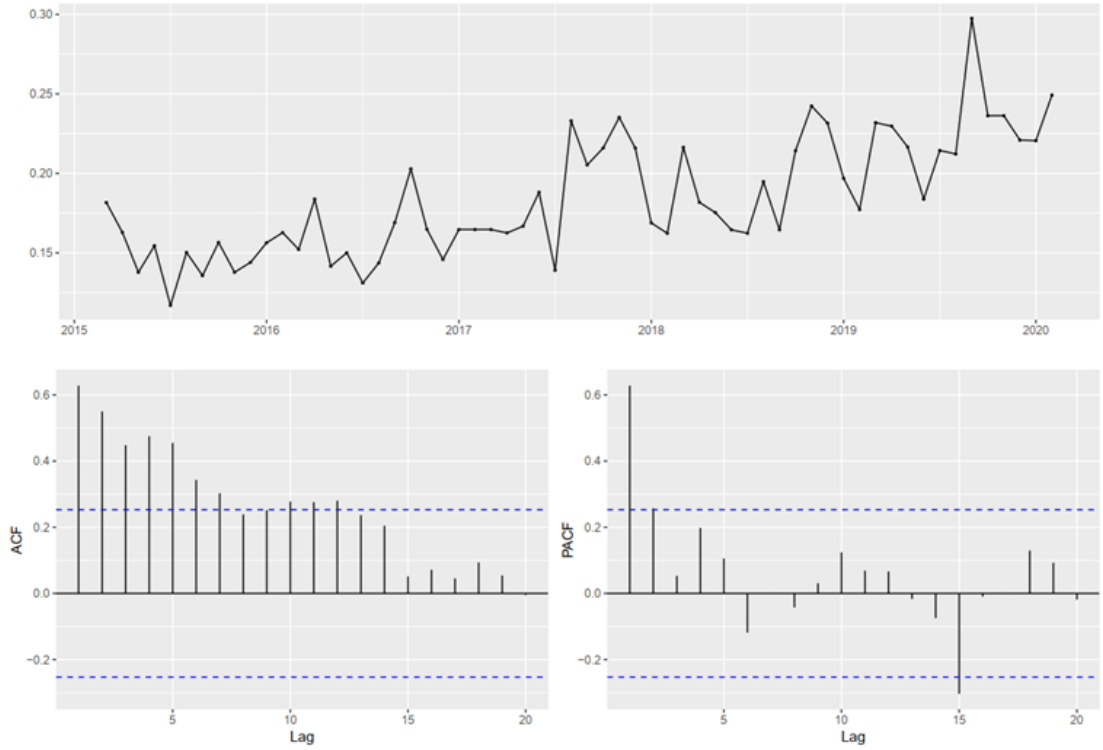
Methods were classified according to ICD-10 underlying cause of death codes.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S33 Seasonal trend decomposition of monthly suicide mortality rate time series – Overall



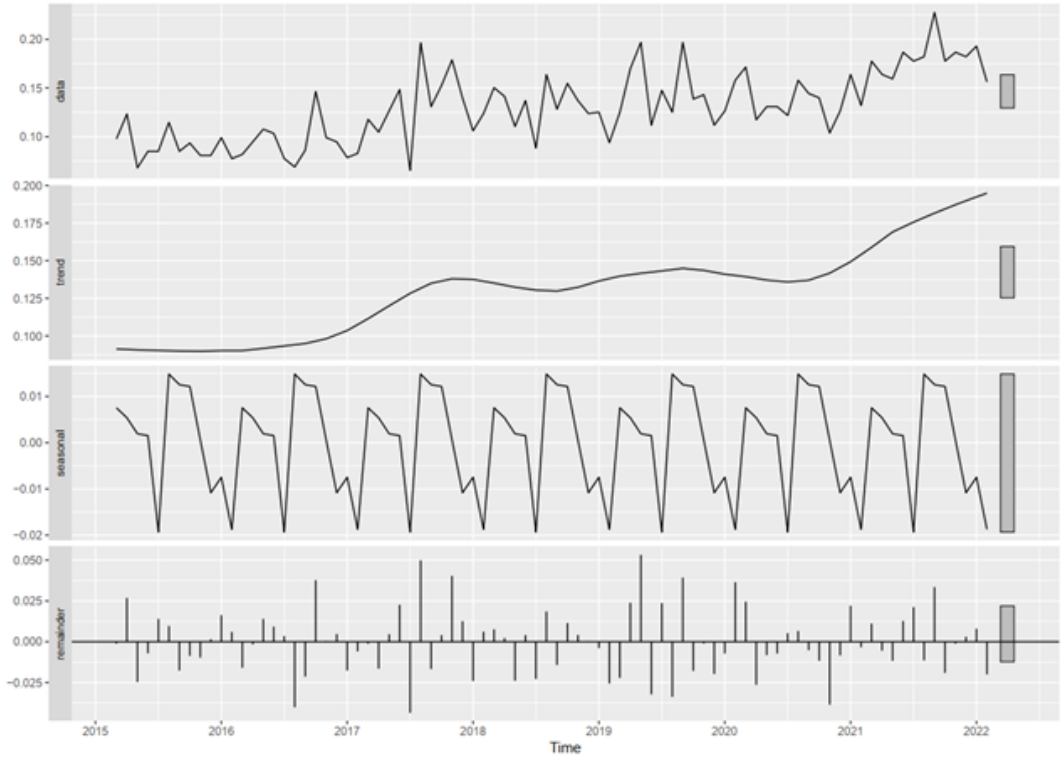
Supplementary Figure S34 ACF and PACF diagnostics for monthly suicide mortality rates time series – Overall



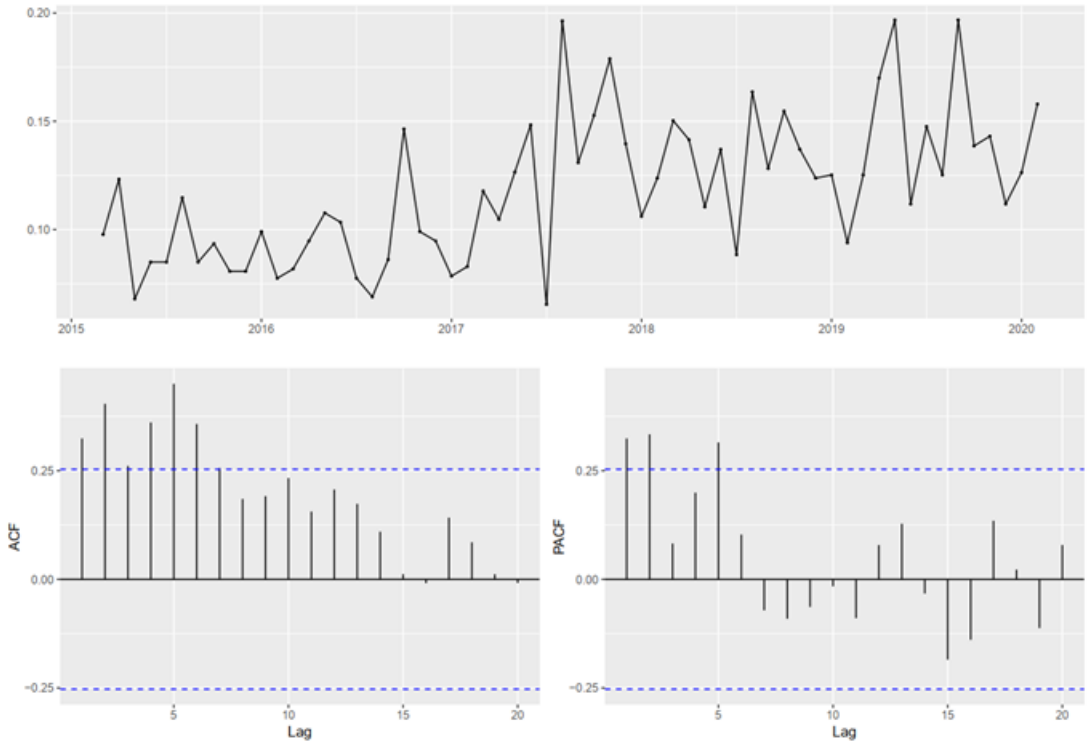
ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S35 Seasonal trend decomposition of monthly suicide mortality rate time series – Female



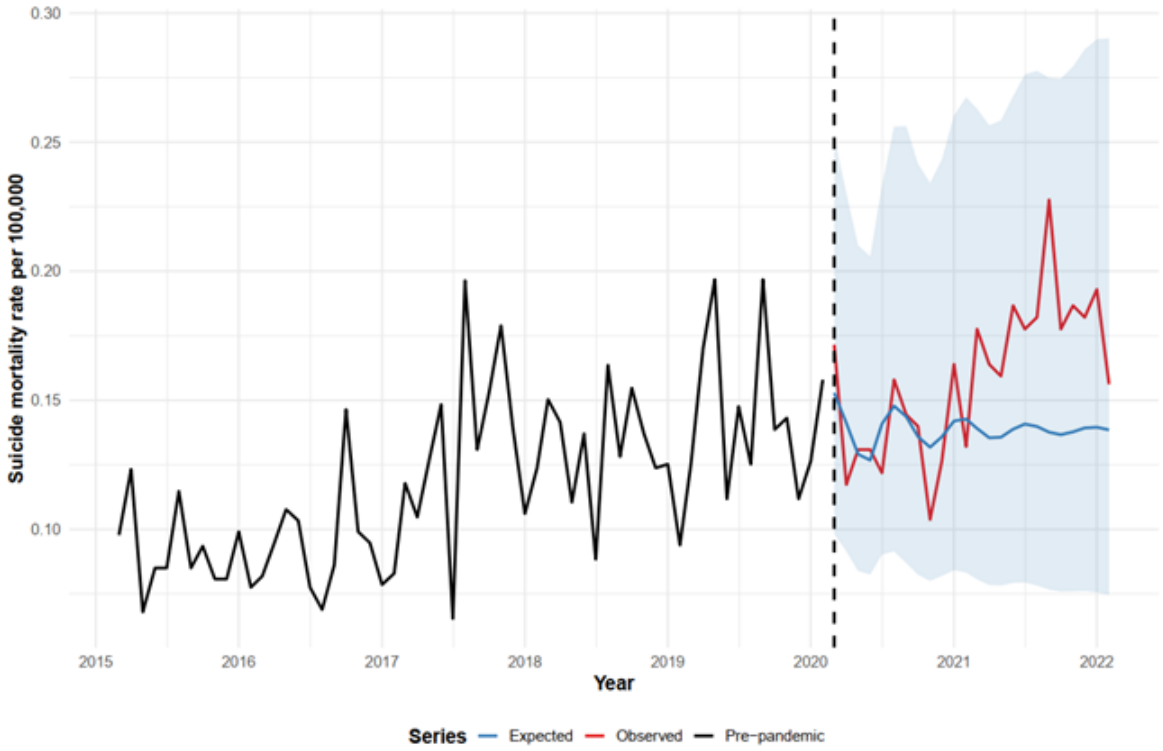
Supplementary Figure S36 ACF and PACF diagnostics for monthly suicide mortality rates time series – Female



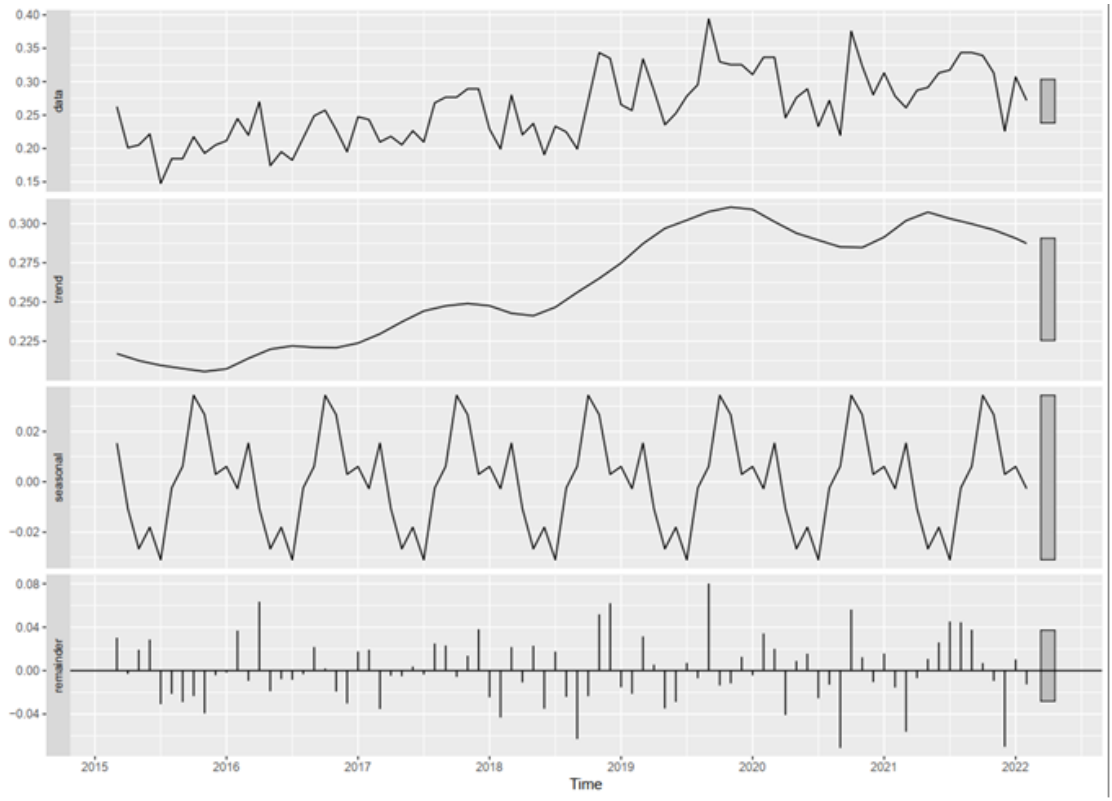
ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S37 Observed and counterfactual expected suicide mortality rates with 95% prediction intervals – Female

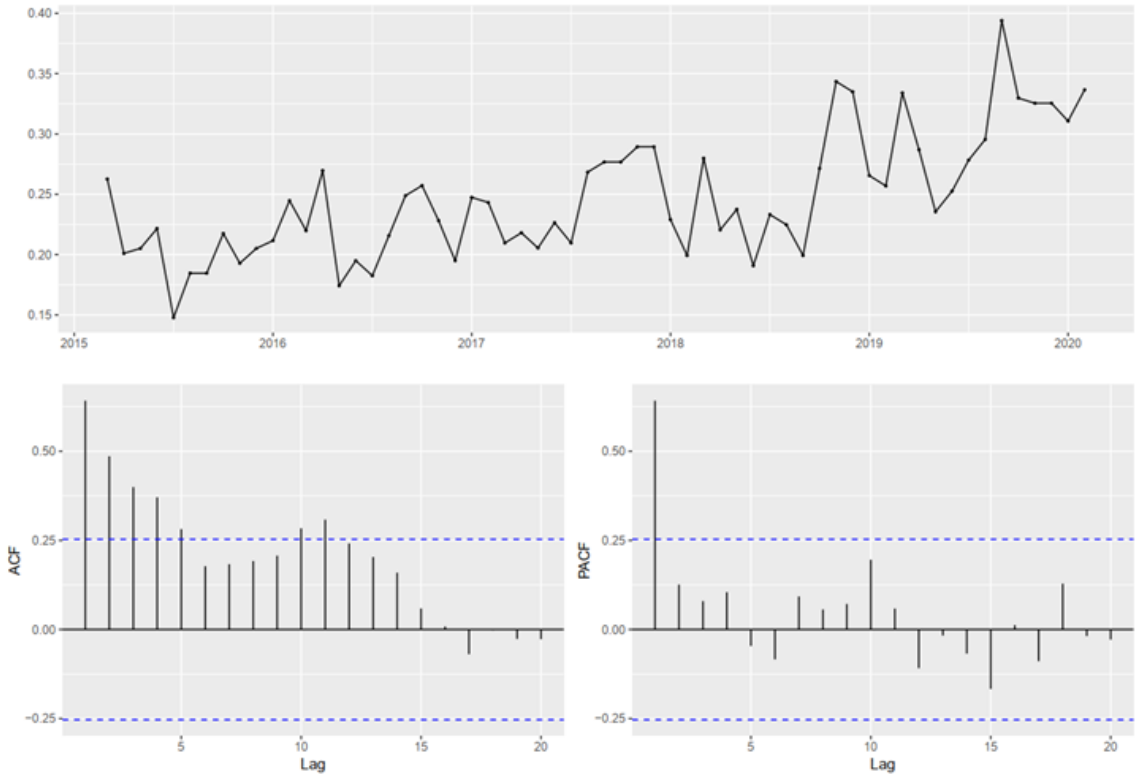


Supplementary Figure S38 Seasonal trend decomposition of monthly suicide mortality rate time series – Male

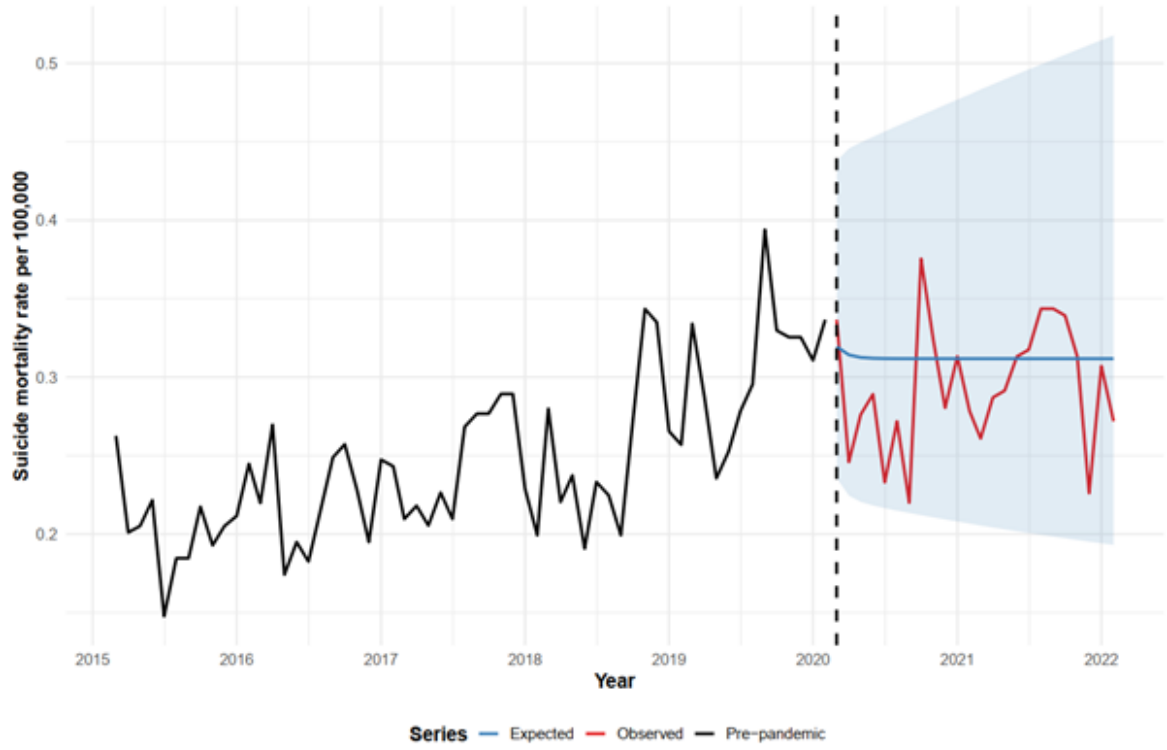


http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S39 ACF and PACF diagnostics for monthly suicide mortality rates time series – Male

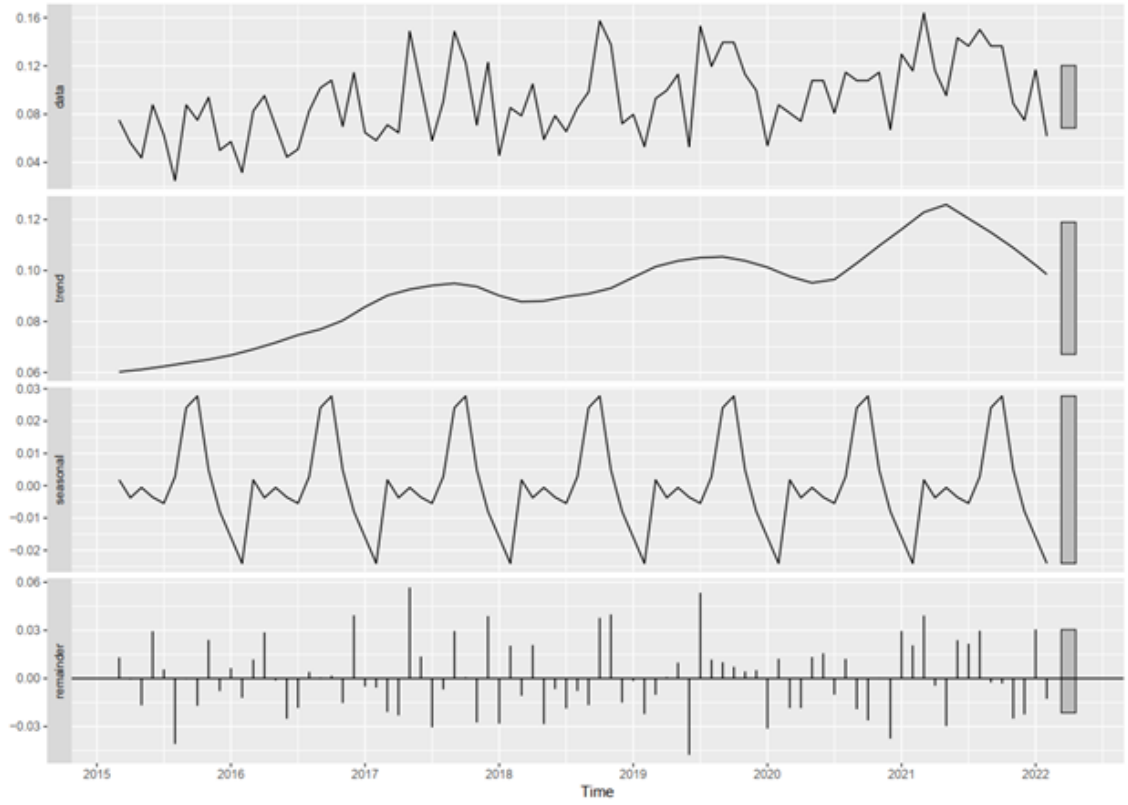


Supplementary Figure S40 Observed and counterfactual expected suicide mortality rates with 95% prediction intervals – Male

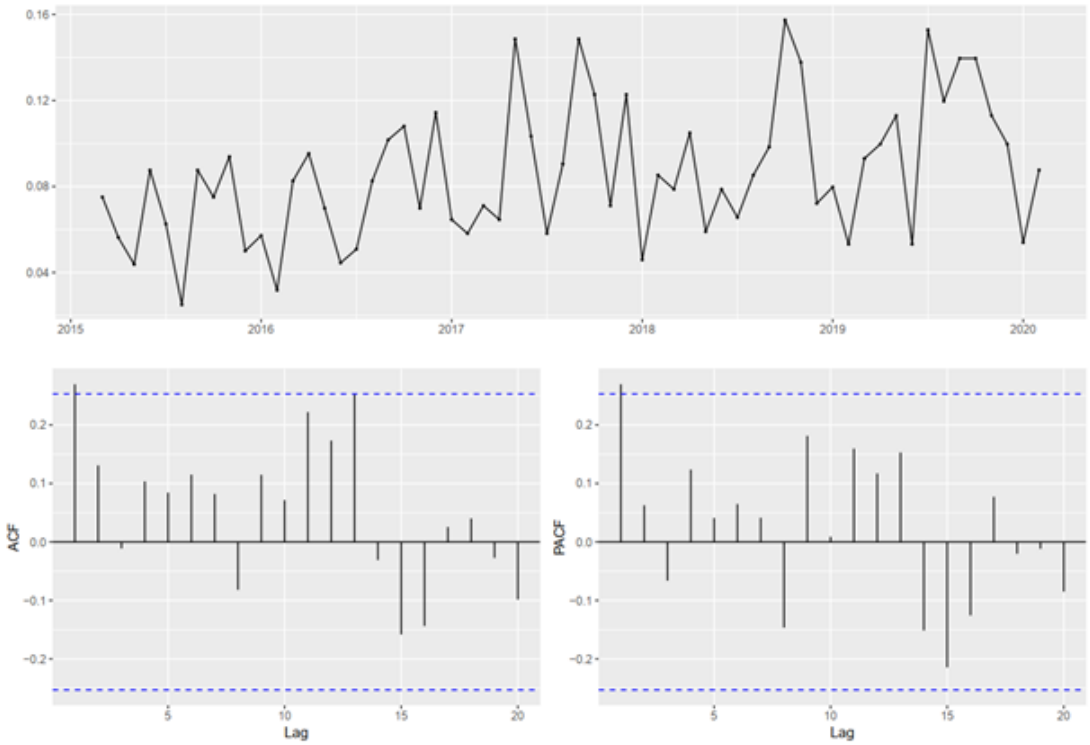


http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S41 Seasonal trend decomposition of monthly suicide mortality rate time series – 10 to 14 years



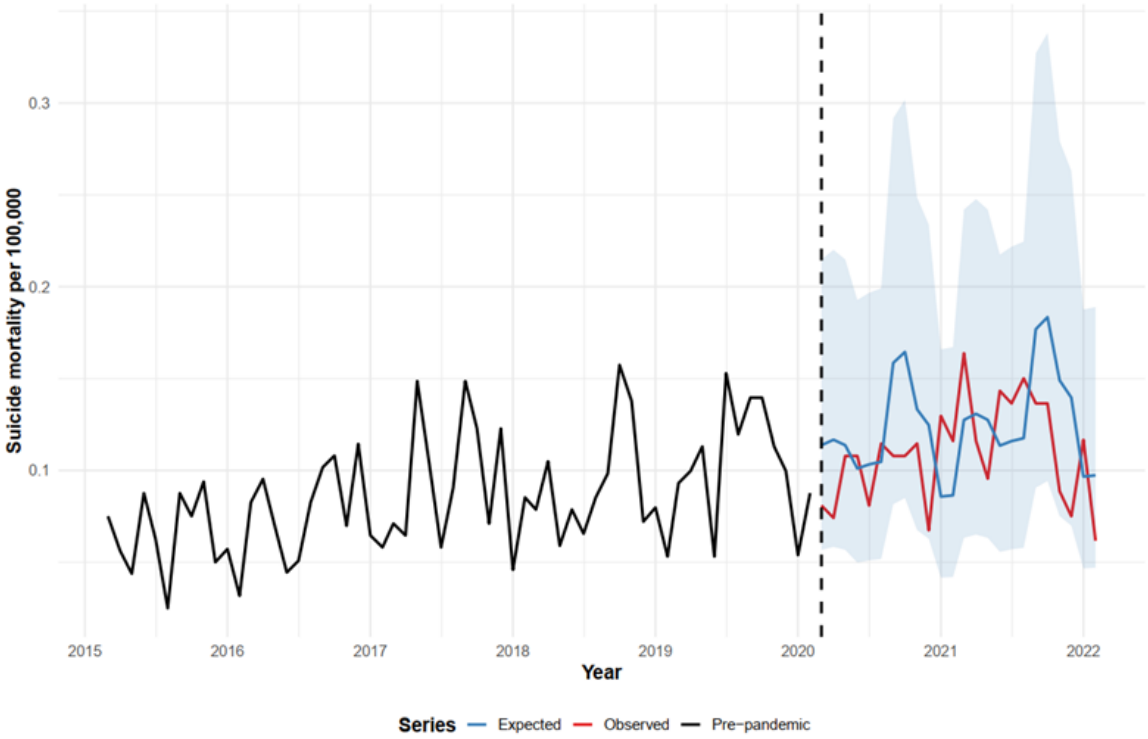
Supplementary Figure S42 ACF and PACF diagnostics for monthly suicide mortality rates time series – 10 to 14 years



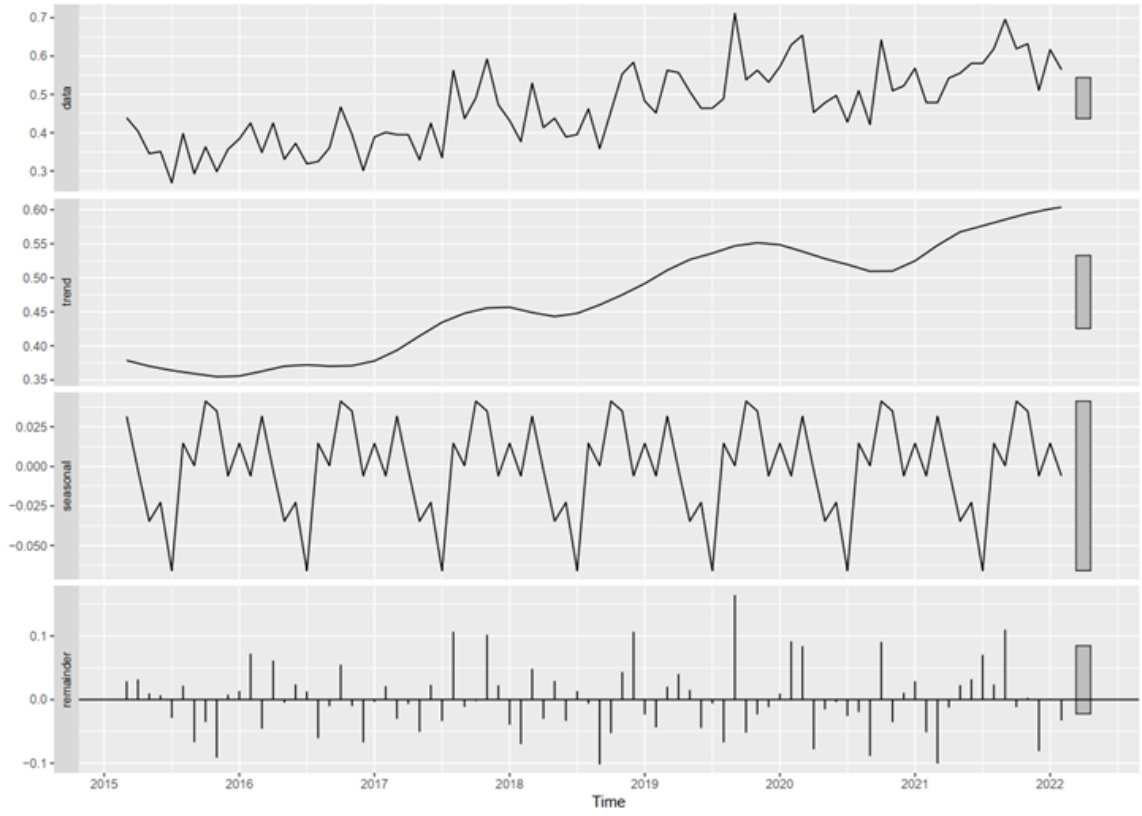
ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S43 Observed and counterfactual expected suicide mortality rates with 95% prediction intervals – 10 to 14 years

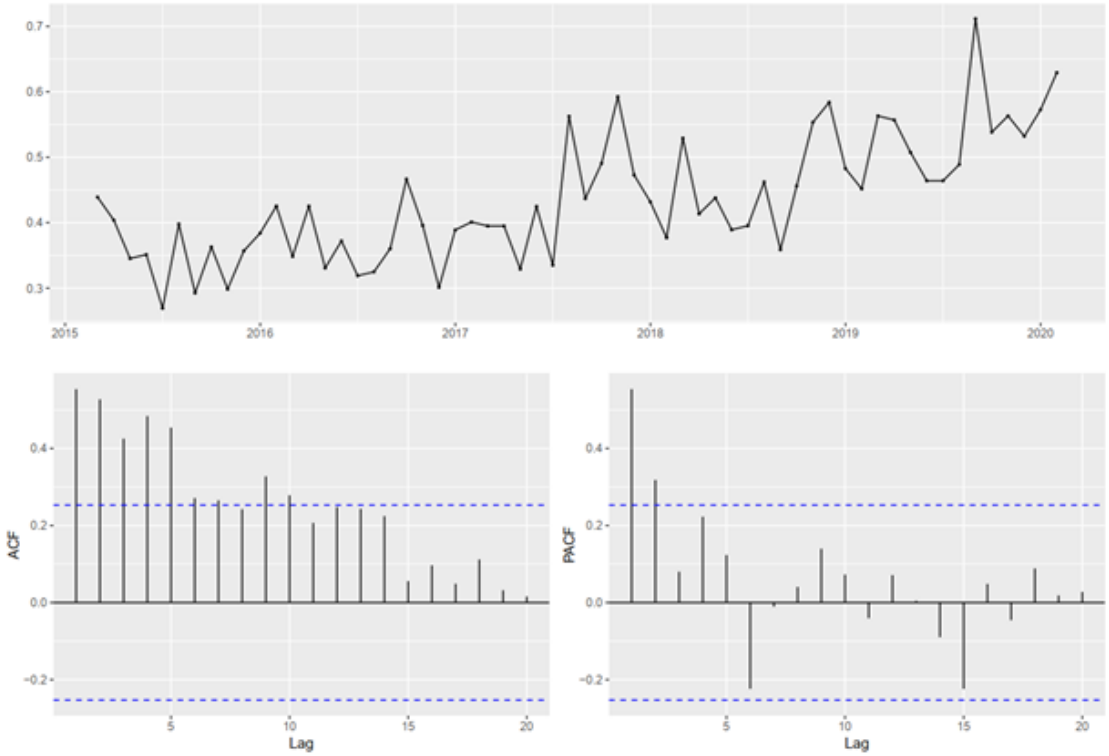


Supplementary Figure S44 Seasonal trend decomposition of monthly suicide mortality rate time series – 15 to 19 years



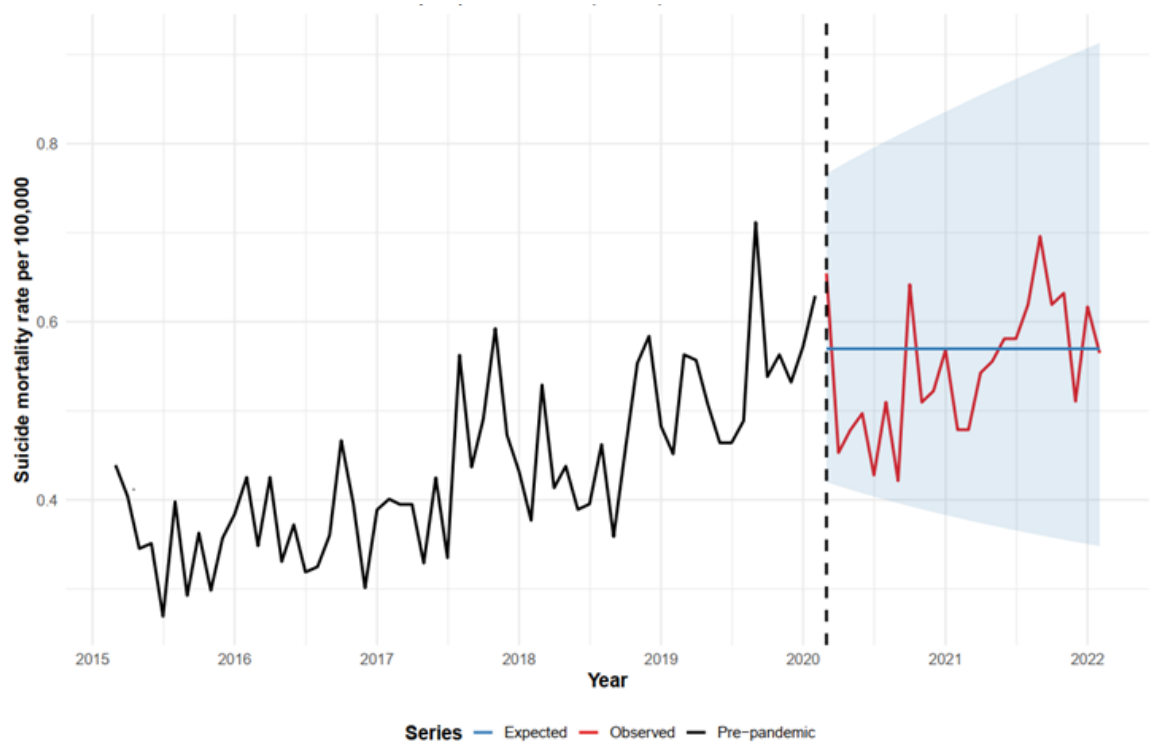
http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S45 ACF and PACF diagnostics for monthly suicide mortality rates time series – 15 to 19 years



ACF = autocorrelation; PACF = partial autocorrelation.

Supplementary Figure S46 Observed and counterfactual expected suicide mortality rates with 95% prediction intervals – 15 to 19 years



Supplementary Table S8 Metrics of ARIMA/SARIMA models – Suicide mortality rates

					After differencing		Ljung–Box test		Metrics – training			Metrics – testing			Information criteria		
	Model	λ	ADF	p	ADF	p	χ^2	p	MAE	RMSE	MAPE	MAE	RMSE	MAPE	AIC	AICc	BIC
Overall sample	(0,1,1)(1,0,0)[12]	-0.3463	-4.07	0.0128	-6.56	<0.01	10.90	0.9761	0.02	0.03	10.07	0.03	0.03	12.8	7.09	7.53	13.32
Female	(5,1,0)	-0.2624	-3.73	0.0297	-6.54	<0.01	7.86	0.988	0.02	0.03	15.9	0.03	0.03	16.33	65.61	67.23	78.08
Male	(1,1,1)	-0.1159	-3.74	0.0292	-6.52	<0.01	10.69	0.9789	0.03	0.04	11.44	0.03	0.04	12.78	-30.17	-29.73	-23.93
05 to 09 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10 to 14 years	(0,1,1)(0,1,1)[12]	0.1331	-4.36	0.01	-6.17	<0.01	23.45	0.3766	0.02	0.02	20.75	0.03	0.04	34.36	21.07	21.63	26.62
15 to 19 years	(0,1,1)	0.0882	-3.67	0.0333	-6.88	<0.01	19.1	0.6954	0.05	0.07	12.02	0.06	0.08	12.43	-55.91	-55.7	-51.76
Central-West	(0,1,1)	0.6515	-4.22	0.01	-6.1	<0.01	20.41	0.6169	0.07	0.09	26.33	0.05	0.07	14.62	-61.28	-61.06	-57.12
North	(0,1,1)	0.9818	-4.31	0.01	-5.72	<0.01	20.38	0.6187	0.059	0.07	22.34	0.1	0.09	24.36	-131.76	-131.55	-127.61
Northeast	(0,1,1)	-0.6324	-3.78	0.0257	-5.05	<0.01	18.47	0.7313	0.03	0.04	19.76	0.03	0.04	16.32	157.06	157.27	161.22
South	(0,1,1)	0.0863	-3.66	0.0357	-5.34	<0.01	17.03	0.8077	0.06	0.7	24.91	0.07	0.1	32.03	17.22	17.44	21.38
Southeast	(0,1,1)(0,01)[12]	0.1281	-4.63	0.01	-6.89	<0.01	15.52	0.8391	0.03	0.03	19.15	0.03	0.04	21.31	-20.41	-19.97	-14.18

ADF = augmented Dickey–Fuller test; AIC = Akaike information criterion; AICc = corrected Akaike information criterion; BIC = Bayesian information criterion; MAE = mean absolute error; MAPE = mean absolute percentage error; NA = not assessed; RMSE = root mean squared error.

Supplementary Table S9 Metrics of ARIMA/SARIMA models – Deaths by suicide

					After differencing		Ljung–Box test		Metrics – training			Metrics – testing			Information criteria		
	Model	λ	ADF	p	ADF	p	χ^2	p	MAE	RMSE	MAPE	MAE	RMSE	MAPE	AIC	AICc	BIC
Overall sample	(0,1,1)(1,0,0)[12]	-0.4289	-4.07	0.0126	-6.53	0.01	10.93	0.9757	8.97	12.02	10.09	12.12	15.46	12.97	-287.56	-287.12	-281.32
Female	(5,1,0)	-0.2957	-3.7	0.0323	-6.5	0.01	7.85	0.9881	4.52	6.1	15.99	5.81	7.25	15.66	-115.42	-113.8	-102.95
Male	(1,1,1)	-0.1089	-3.78	0.0259	-6.47	0.01	10.92	0.9759	6.69	8.78	11.45	7.93	9.99	12.82	-101.97	-101.53	-95.74
05 to 09 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10 to 14 years	(0,1,1)(0,1,1)[12]	0.1449	-4.35	0.01	-6.15	0.01	23.56	0.3709	2.56	3.55	20.73	4.97	5.53	34.29	86.86	87.41	92.41
15 to 19 years	(0,1,1)	0.0713	-3.77	0.0268	-6.84	0.01	18.7	0.7184	8.67	11.38	11.97	10.21	12.13	12.63	-11.63	-11.42	-7.48
Central-West	(0,1,1)	0.6897	-4.23	0.01	-6.1	0.01	-4.23	0.01	3.52	3.27	26.38	1.89	2.50	14.62	225.99	226.21	230.15
North	(0,1,1)	1	-4.35	0.01	-5.74	0.01	-4.35	0.01	2.97	3.68	22.37	4.17	5.01	24.53	340.41	340.63	344.57
Northeast	(0,0,0)	-0.7049	-3.79	0.0247	NA	NA	-3.79	0.0247	4.11	5.25	20.39	5.64	6.84	21.1	-242.31	-242.1	-238.12
South	(0,1,1)	0.088	-3.66	0.036	-5.34	0.01	-3.66	0.036	3.51	4.47	24.93	4.49	5.95	32.21	59.73	59.94	63.88
Southeast	(0,1,1)(0,01)[12]	0.1397	-4.62	0.01	-6.85	0.01	-4.62	0.01	4.76	6.17	19.13	5.88	7.36	21.45	62.26	62.70	68.49

ADF = augmented Dickey–Fuller test; AIC = Akaike information criterion; AICc = corrected Akaike information criterion; BIC = Bayesian information criterion; MAE = mean absolute error; MAPE = mean absolute percentage error; NA = not assessed; RMSE = root mean squared error.

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Supplementary Table S10 ARIMAX/SARIMAX intervention estimates for the onset of the COVID-19 pandemic on suicide mortality rates

Intervention month/sample	Model	β	SE	p	AICc
February 2020					
Overall sample	(0,1,1)(1,0,0)[12]	-0.05	0.17	0.7522	6.12
Female	(5,1,0)	0.02	0.19	0.9124	76.79
Male	(1,0,1)(1,1,1,0)[12]	0.06	0.12	0.6339	-11.20
05 to 09 years	NA	NA	NA	NA	NA
10 to 14 years	(01,1,1)(0,1,1)[12]	-0.10	0.09	0.2185	21.18
15 to 19 years	(0,1,1)	-0.21	0.10	0.0399	-89.27
March 2020					
Overall sample	(0,1,1)(1,0,0)[12]	-0.22	0.16	0.1545	4.31
Female	(5,1,0)	-0.053	0.19	0.7749	76.72
Male	(1,0,1)(1,1,1,0)[12]	-0.15	0.10	0.1438	-12.31
05 to 09 years	NA	NA	NA	NA	NA
10 to 14 years	(1,0,0)(1,1,0)[12]	-0.29	0.14	0.0427	-54.67
15 to 19 years	(1,0,0)(1,1,0)[12]	-0.10	0.08	0.2137	-129.71
April 2020					
Overall sample	(0,1,1)(1,0,0)[12]	-0.37	0.16	0.0208	0.88
Female	(5,1,0)	-0.11	0.19	0.5660	76.47
Male	(1,0,1)(1,1,1,0)[12]	-0.18	0.09	0.0461	-13.66
05 to 09 years	NA	NA	NA	NA	NA
10 to 14 years	(01,1,1)(0,1,1)[12]	-0.07	0.08	0.4008	21.98
15 to 19 years	(0,1,1)	-0.21	0.10	0.0399	-89.27

AICc = corrected Akaike information criterion; NA = not assessed; SE = standard error.
Results from ARIMAX/SARIMAX intervention analyses evaluating the immediate effects of the COVID-19 pandemic onset on monthly suicide mortality rates, overall and stratified by sex and age group. Three different months were included to investigate the effect: February, March, and April 2020.
Regression coefficients (β) represent the estimated relative change in the outcome following each intervention month.

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Supplementary Table S11 ARIMAX/SARIMAX intervention estimates for the onset of the COVID-19 pandemic on death by suicide records

Intervention month/sample	Model	β	SE	p	AICc
February 2020					
Overall sample	(0,1,1)(1,0,0)[12]	-0.01	0.01	0.6666	-408.39
Female	(5,1,0)	0.002	0.04	0.9694	-177.98
Male	(1,0,1)(1,1,1,0)[12]	0.03	0.06	0.6209	-98.91
05 to 09 years	NA	NA	NA	NA	NA
10 to 14 years	(01,1,1)(0,1,1)[12]	-0.17	0.17	0.3257	120.98
15 to 19 years	(0,1,1)	-0.03	0.13	0.8076	-22.51
March 2020					
Overall sample	(0,1,1)(1,0,0)[12]	-0.02	0.01	0.1323	-410.33
Female	(5,1,0)	-0.01	0.04	0.7316	-178.1
Male	(1,0,1)(1,1,1,0)[12]	-0.08	0.06	0.1722	-99.67
05 to 09 years	NA	NA	NA	NA	NA
10 to 14 years	(01,1,1)(0,1,1)[12]	-0.21	1.34	0.47	120.48
15 to 19 years	(0,1,1)	-0.13	0.13	0.3029	-23.53
April 2020					
Overall sample	(0,1,1)(1,0,0)[12]	-0.03	0.01	0.0196	-413.7
Female	(5,1,0)	-0.02	0.04	0.5425	-178.36
Male	(1,0,1)(1,1,1,0)[12]	-0.10	0.05	0.0552	-100.98
05 to 09 years	NA	NA	NA	NA	NA
10 to 14 years	(01,1,1)(0,1,1)[12]	-0.14	0.17	0.4105	121.26
15 to 19 years	(0,1,1)	-0.3	0.14	0.03914	-27.24

AICc = corrected Akaike information criterion; NA = not assessed; SE = standard error.
Results from ARIMAX/SARIMAX intervention analyses evaluating the immediate effects of the COVID-19 pandemic onset on monthly death by suicide records, overall and stratified by sex and age group. Three different months were included to investigate the effect: February, March, and April 2020.
Regression coefficients (β) represent the estimated relative change in the outcome following each intervention month.

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Supplementary Table S12 Interrupted time-series regression estimates of immediate and trend changes in monthly suicide mortality rates associated with the onset of the COVID-19 pandemic

	March			April		
Sample/parameter	**β**	**SE**	**p**	**β**	**SE**	**p**
Overall sample	–	–	–			
Intercept	–	–	–	0.13	0.01	<0.0001
Pre-intervention trend	–	–	–	0.002	0.0002	<0.0001
Immediate level change (COVID-19 onset)	–	–	–	-0.04	0.01	0.0064
Change in post-intervention trend	–	–	–	0.001	0.001	0.3233
Female						
Intercept	–	–	–	0.08	0.01	<0.0001
Pre-intervention trend	–	–	–	0.001	0.001	<0.0001
Immediate level change (COVID-19 onset)	–	–	–	-0.04	0.01	0.0039
Change in post-intervention trend	–	–	–	0.002	0.001	0.0074
Male						
Intercept	0.19	0.01	<0.0001	–	–	–
Pre-intervention trend	0.002	0.0003	<0.0001	–	–	–
Immediate level change (COVID-19 onset)	-0.04	0.03	0.0681	–	–	–
Change in post-intervention trend	-0.0002	0.002	0.8846	–	–	–
10 to 14 years						
Intercept	–	–	–	0.06	0.008	<0.0001
Pre-intervention trend	–	–	–	0.001	0.0002	0.0032
Immediate level change (COVID-19 onset)	–	–	–	-0.002	0.02	0.9029
Change in post-intervention trend	–	–	–	-0.0003	0.001	0.7662
15 to 19 years						
Intercept	–	–	–	0.31	0.02	<0.0001
Pre-intervention trend	–	–	–	0.004	0.0005	<0.0001
Immediate level change (COVID-19 onset)	–	–	–	-0.1	0.03	0.0026
Change in post-intervention trend	–	–	–	0.003	0.002	0.1591

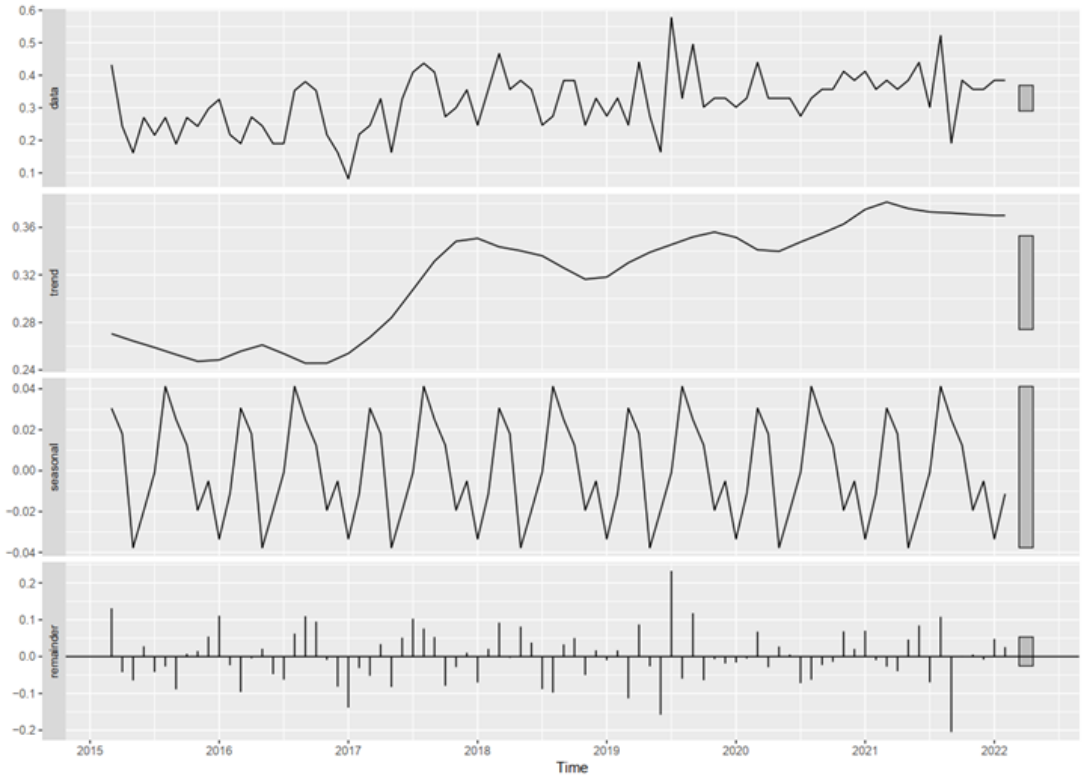
SE: standard error.

Interrupted time-series regression models were fitted to monthly suicide mortality rates to estimate pre-intervention trends, immediate level changes following the onset of the COVID-19 pandemic, and changes in post-intervention trends. For each subgroup, the intervention month shown corresponds to the model with the best fit or strongest evidence of effect based on sensitivity analyses.

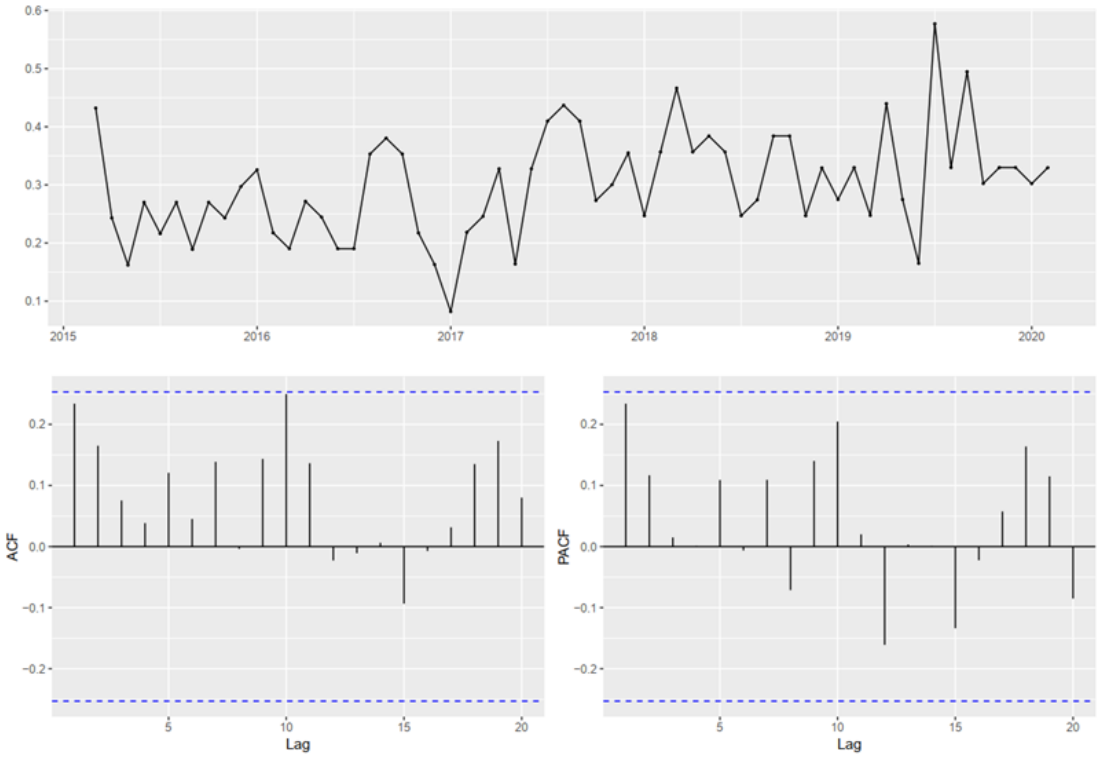
Regression coefficients (β) represent absolute changes in suicide mortality rates.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S47 Seasonal trend decomposition of monthly suicide mortality rate time series – Central-West



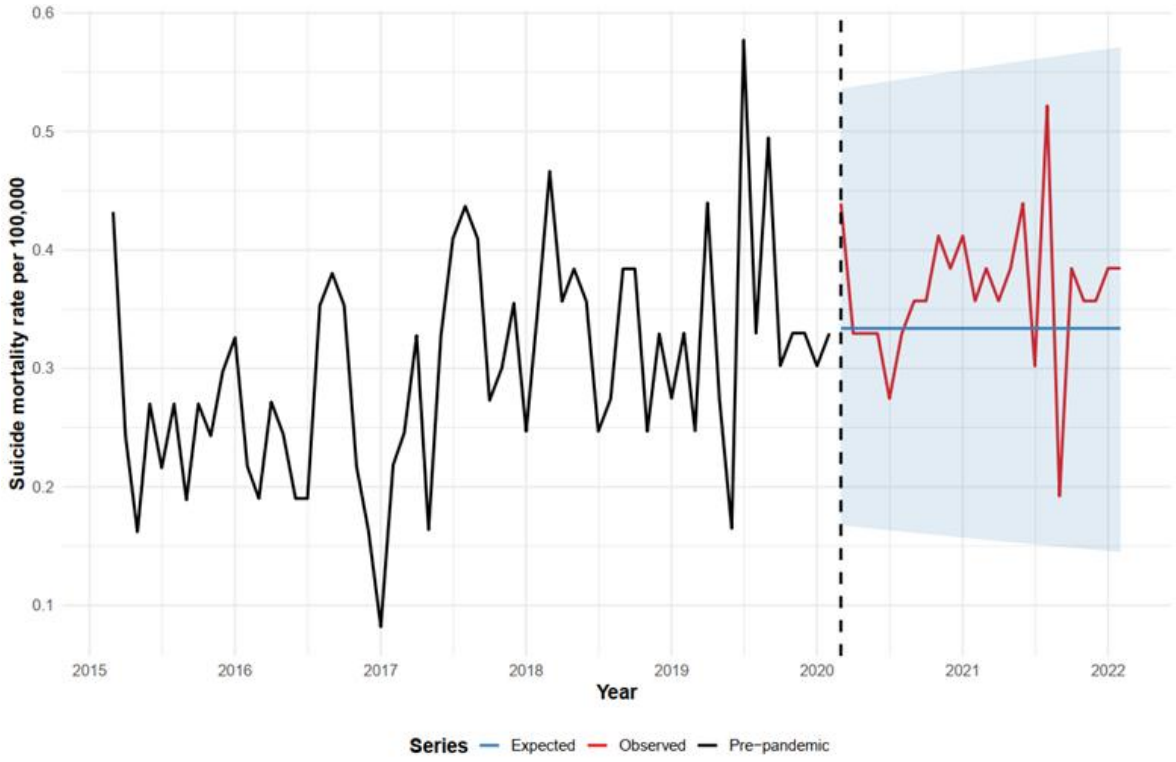
Supplementary Figure S48 ACF and PACF diagnostics for monthly suicide mortality rate time series – Central-West



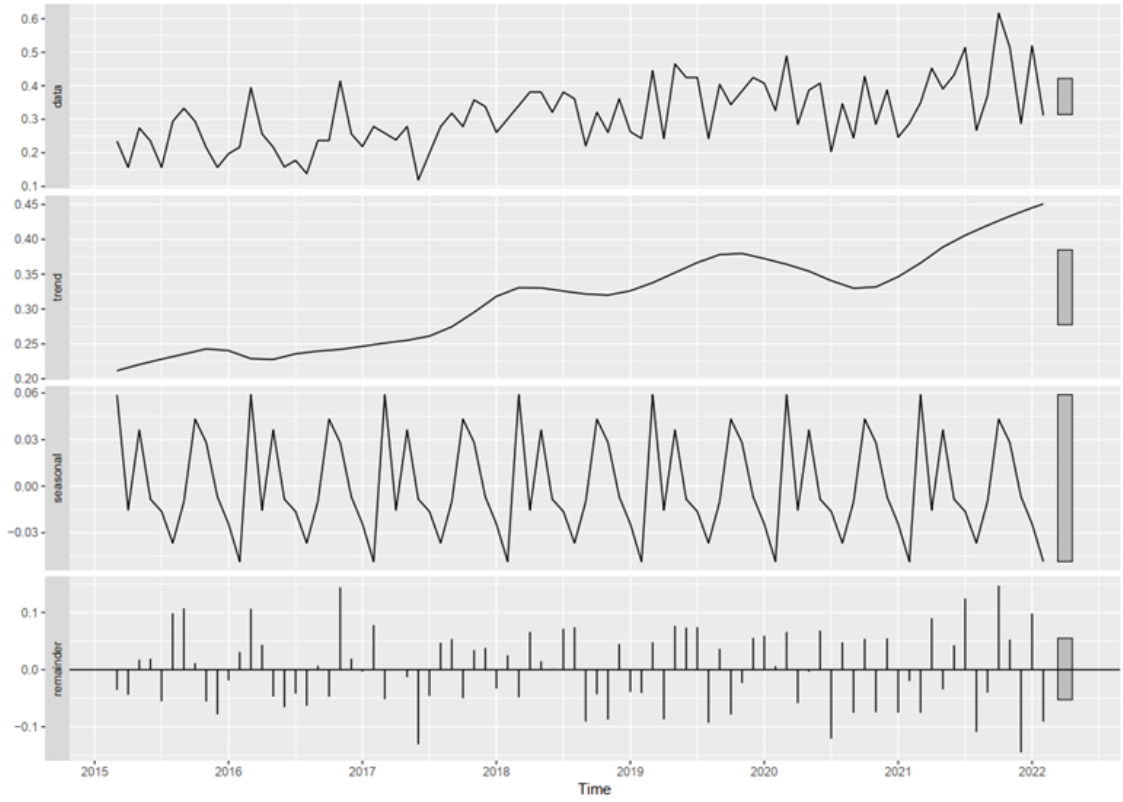
ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S49 Observed and counterfactual expected suicide mortality rates with 95% prediction intervals – Central-West

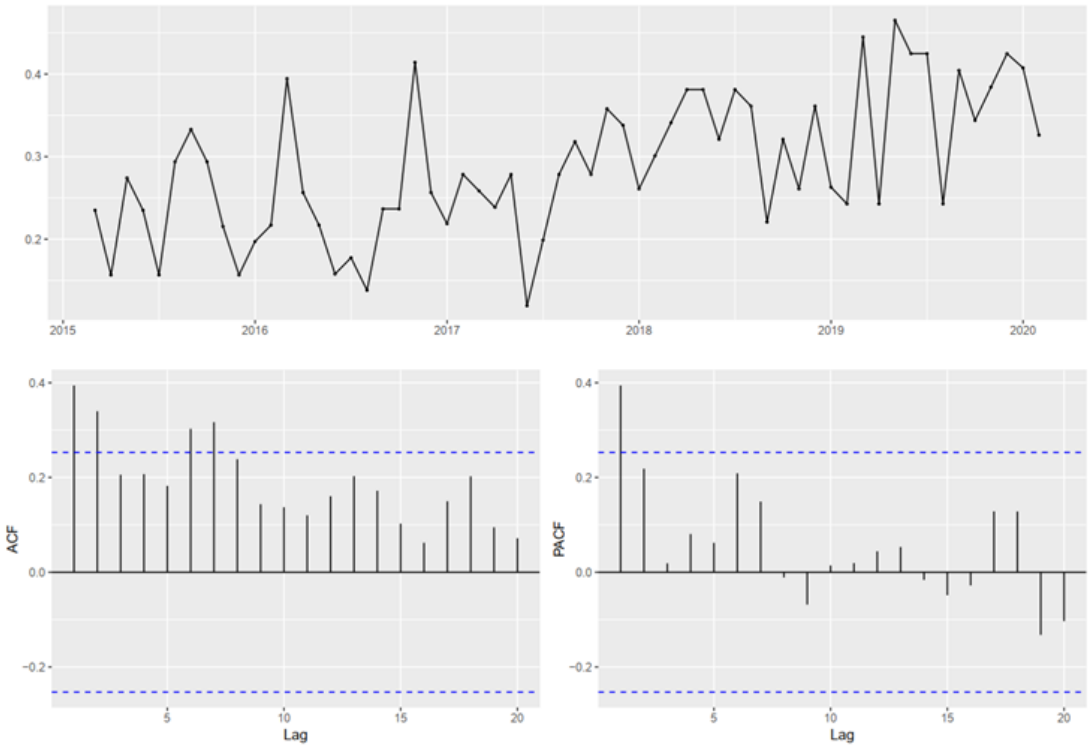


Supplementary Figure S50 Seasonal trend decomposition of monthly suicide mortality rate time series – North



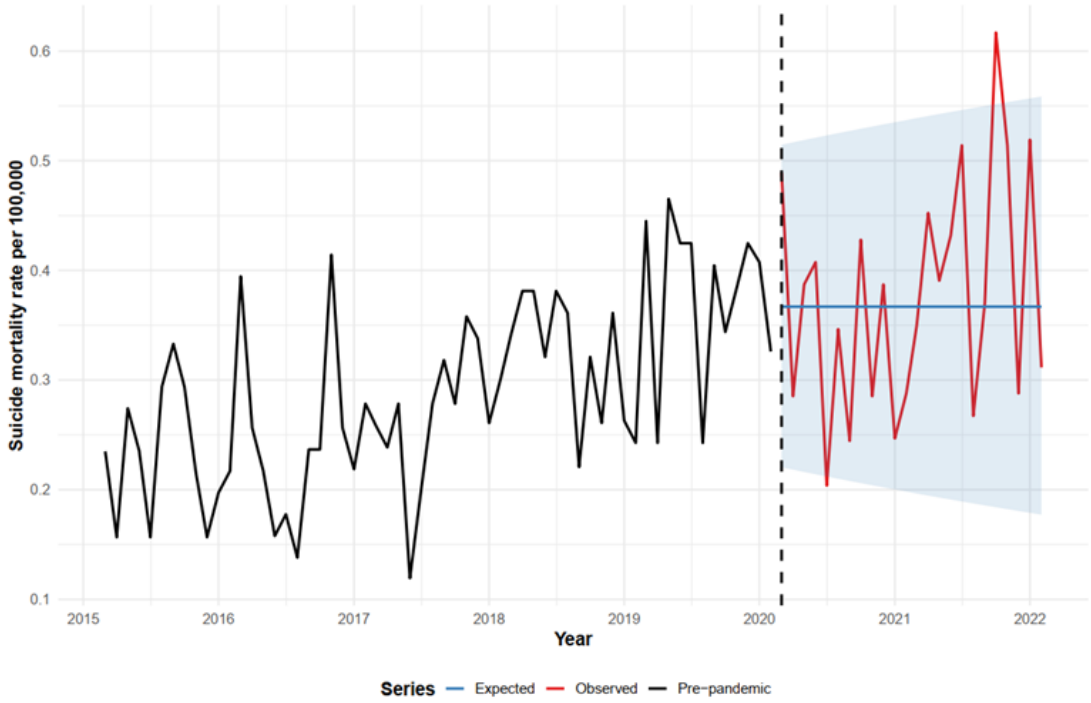
http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S51 ACF and PACF diagnostics for monthly suicide mortality rate time series – North



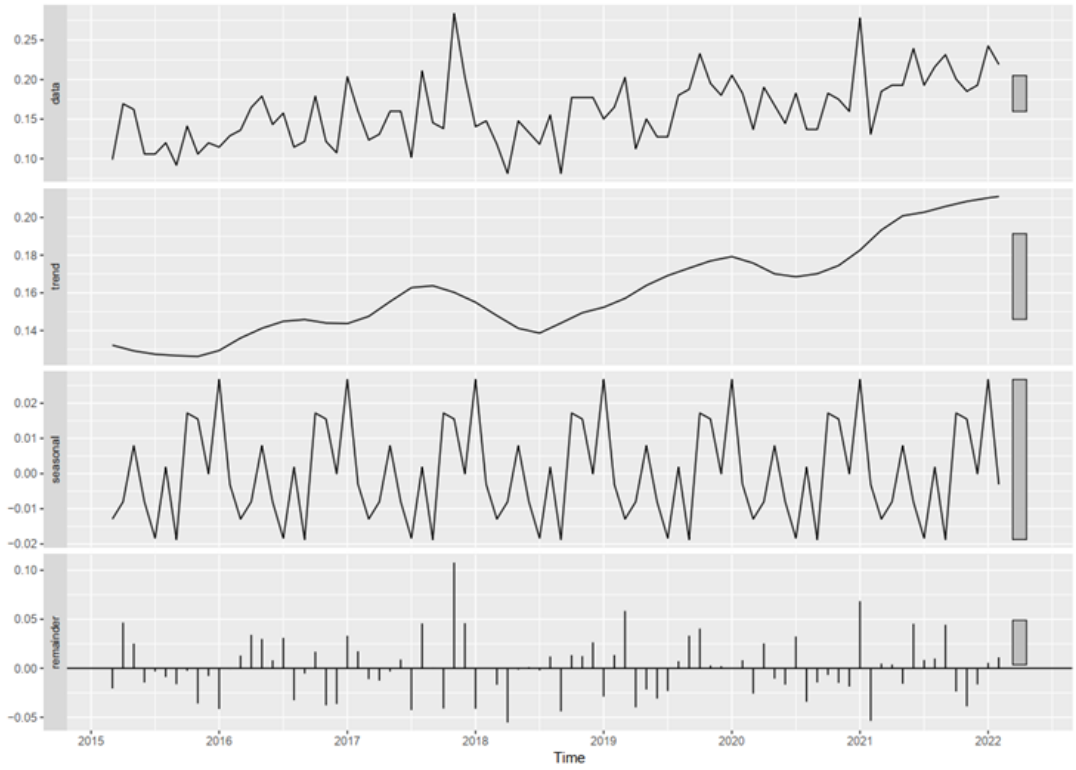
ACF = autocorrelation; PACF = partial autocorrelation.

Supplementary Figure S52 Observed and counterfactual expected suicide mortality rates with 95% prediction intervals – North

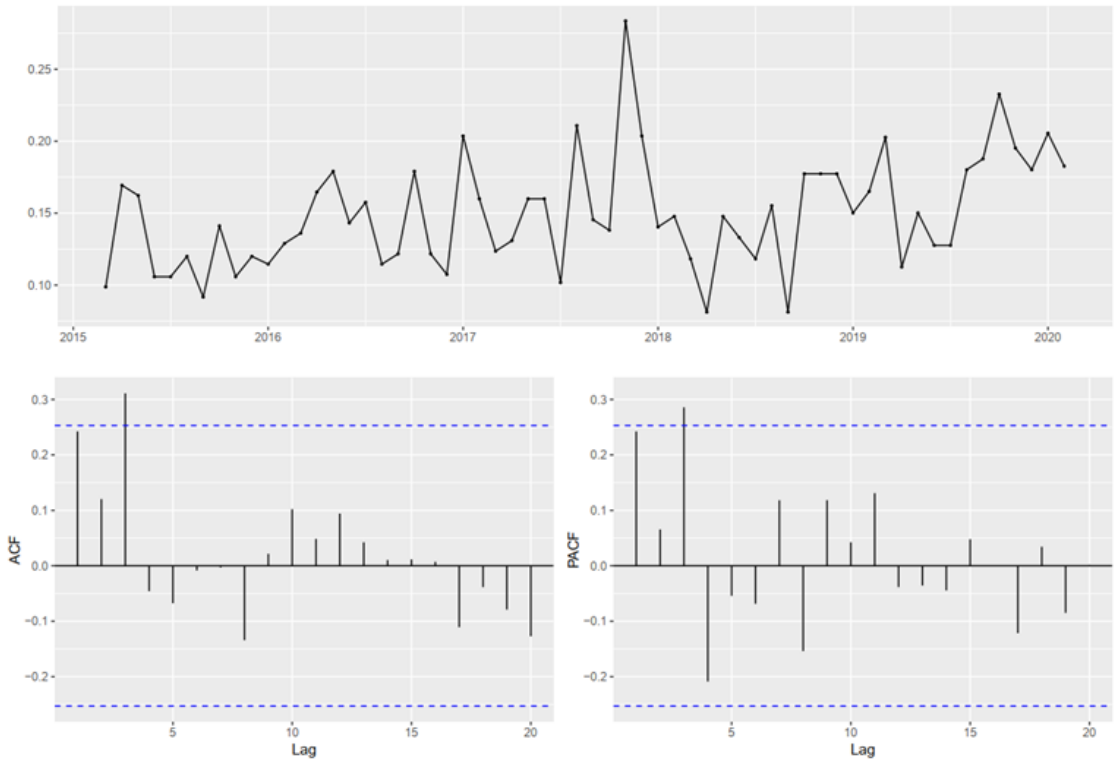


http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S53 Seasonal trend decomposition of monthly suicide mortality rate time series – Northeast



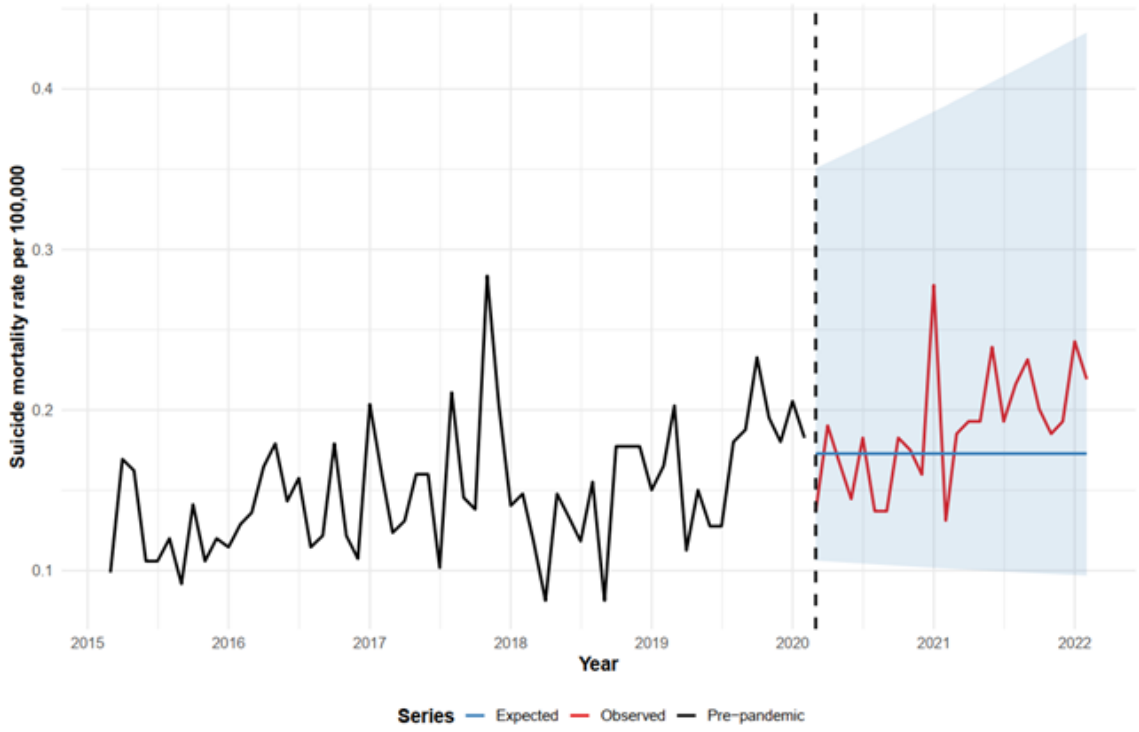
Supplementary Figure S54 ACF and PACF diagnostics for monthly suicide mortality rate time series – Northeast



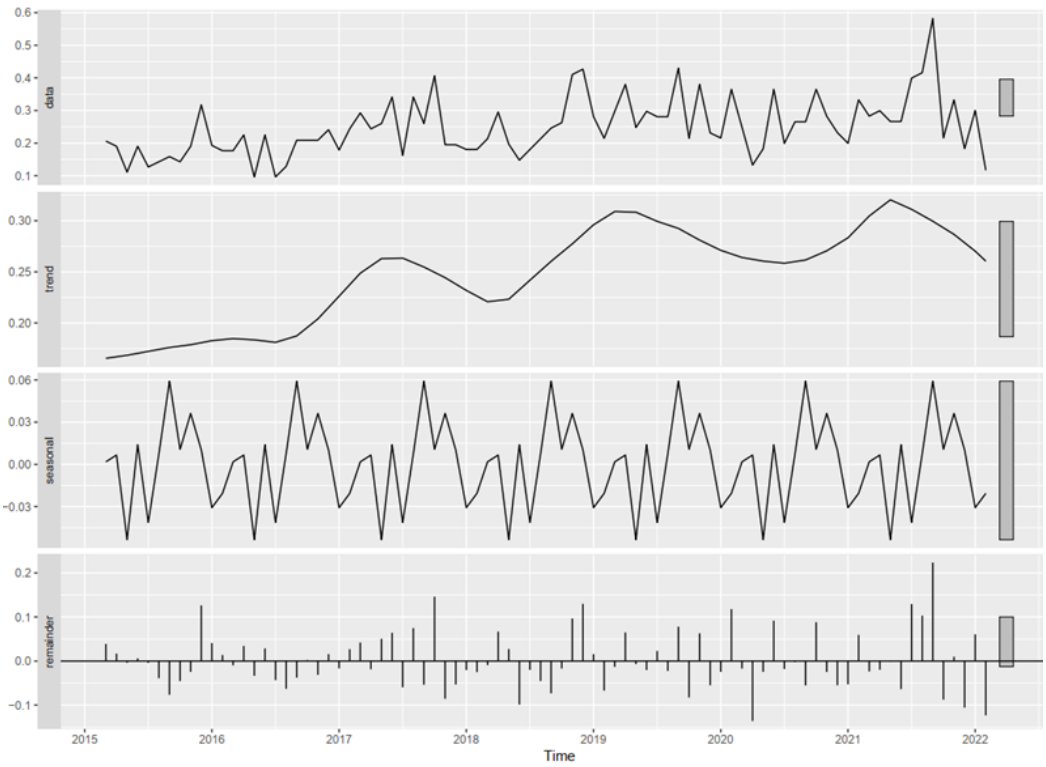
ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S55 Observed and counterfactual expected suicide mortality rates with 95% prediction intervals – Northeast

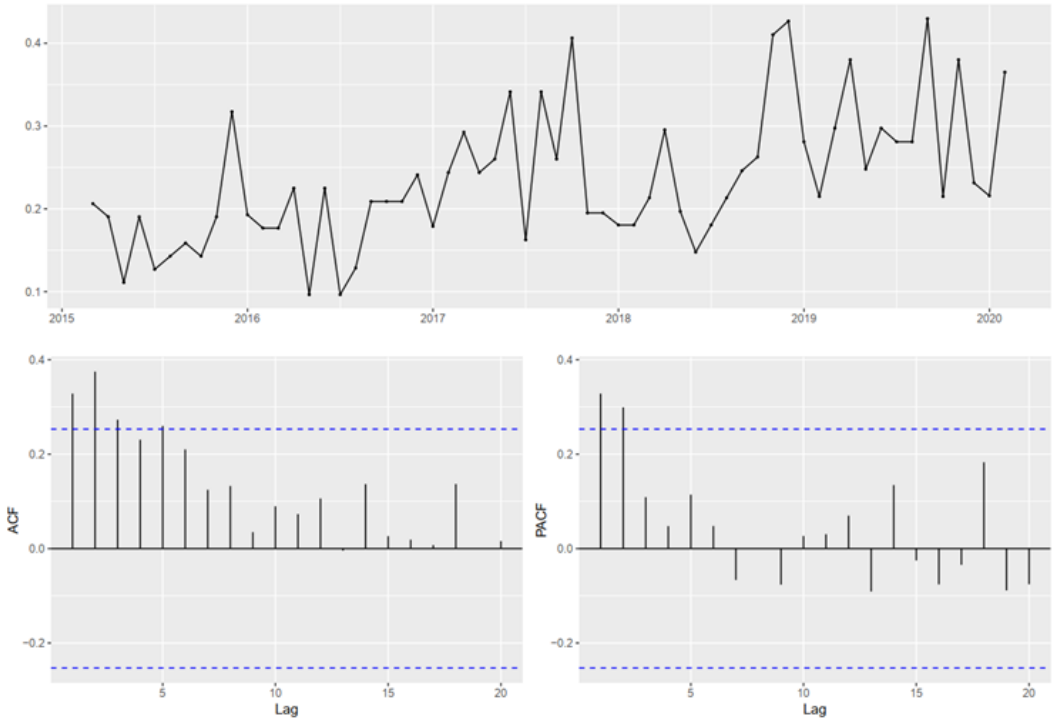


Supplementary Figure S56 Seasonal trend decomposition of monthly suicide mortality rate time series – South



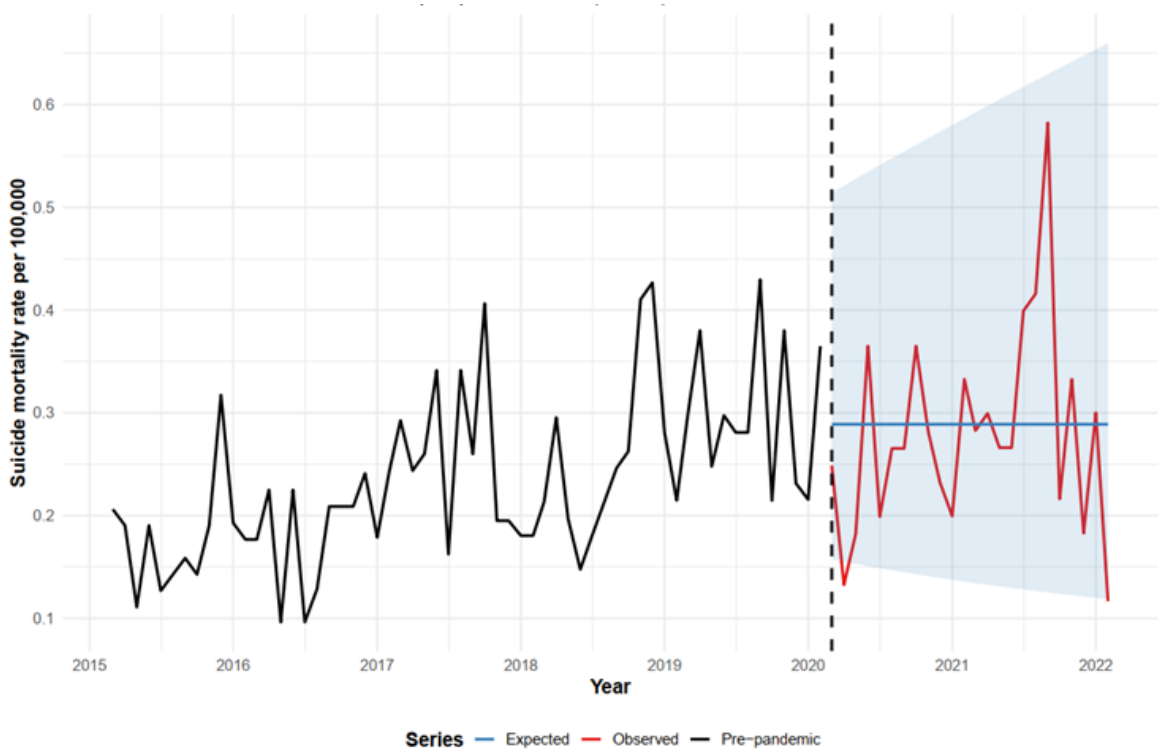
http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S57 ACF and PACF diagnostics for monthly suicide mortality rate time series – South



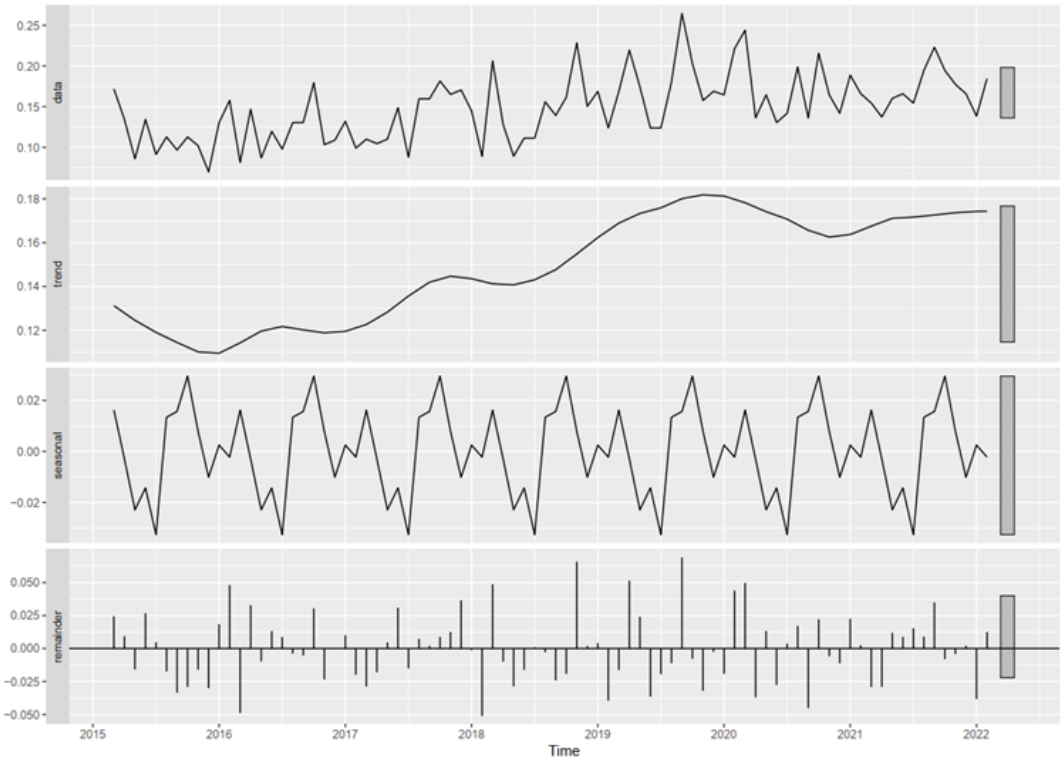
ACF = autocorrelation; PACF = partial autocorrelation.

Supplementary Figure S58 Observed and counterfactual expected suicide mortality rates with 95% prediction intervals – South

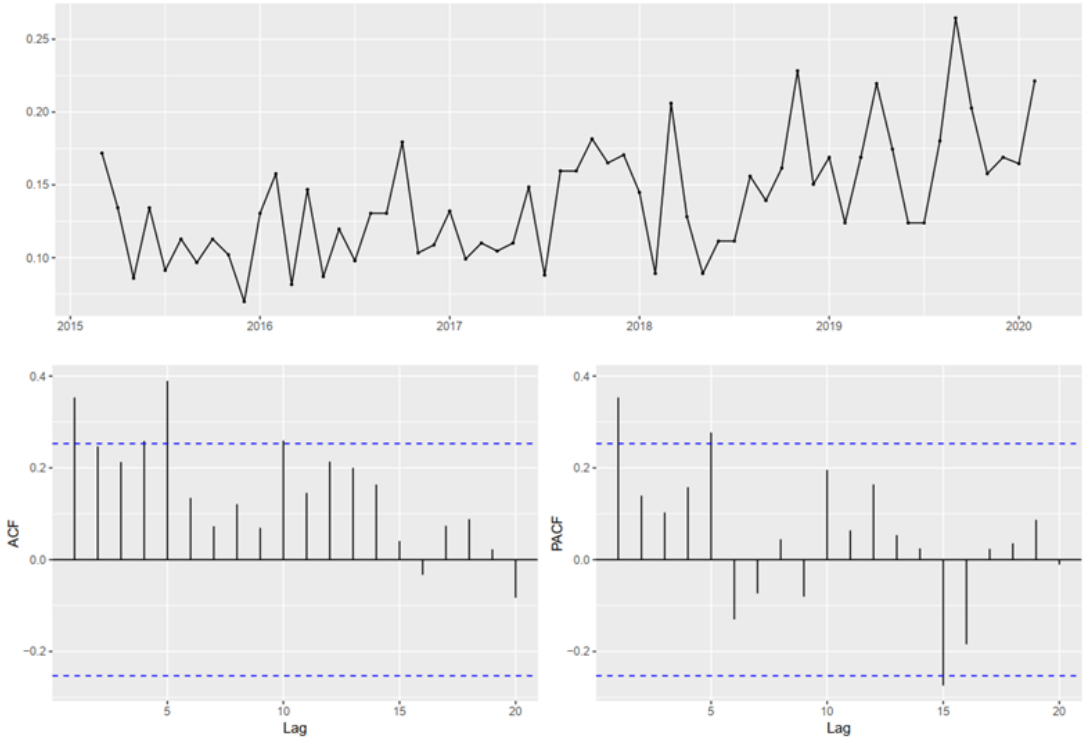


http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S59 Seasonal trend decomposition of monthly suicide mortality rate time series – Southeast



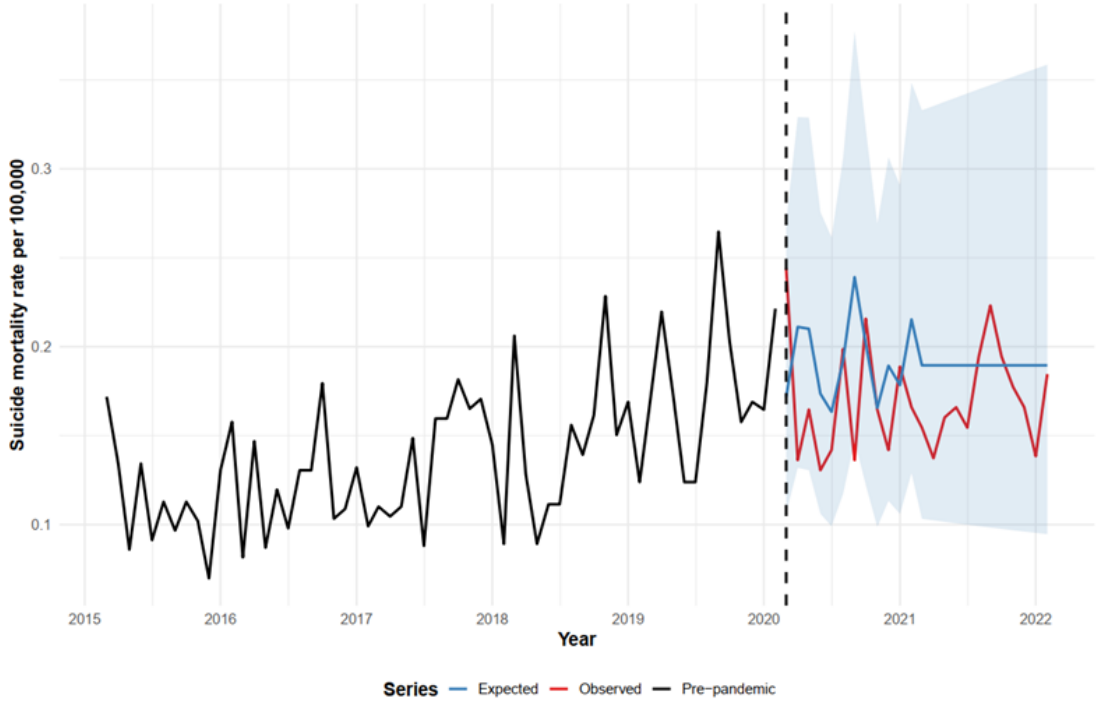
Supplementary Figure S60 ACF and PACF diagnostics for monthly suicide mortality rate time series – Southeast



ACF = autocorrelation; PACF = partial autocorrelation.

http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Figure S61 Observed and counterfactual expected suicide mortality rates with 95% prediction intervals – Southeast



http://doi.org/10.47626/1516-4446-2025-4454

Supplementary Table S13 Sensitivity analysis with SARIMA models excluding last 3 and 6 months

					After differencing		Ljung–Box test		Metrics – training			Metrics – testing			Information criteria		
	Model	λ	ADF	p	ADF	p	χ^2	p	MAE	RMSE	MAPE	MAE	RMSE	MAPE	AIC	AICc	BIC
Self-harm notification rate																	
Without last 3 months	(1,0,0)(1,1,0)[12]	-0,1259	-2,51	0,3699	-5,64	0,01	22,95	0,3465	0,4	5,75	10.36	11.24	181.2	0,4	-95,07	-94,14	-87,58
Without last 6 months	(1,0,0)(1,1,0)[12]	-0,1259	-2,51	0,3699	-5,64	0,01	22,95	0,3465	0,4	5,75	9.07	9.58	177.34	0,4	-95,07	-94,14	-87,58
Self-harm notifications																	
Without last 3 months	(1,0,0)(1,1,0)[12]	-0,1295	-2,55	0,3512	-5,59	0,01	23,19	0,3337	124,48	184,55	5,96	4615.38	5001.87	179.23	-171,88	-170,88	-164,39
Without last 6 months	(1,0,0)(1,1,0)[12]	-0,1295	-2,55	0,3512	-5,59	0,01	23,19	0,3337	124,48	184,55	5,96	4050.36	427.19	175.55	-171,88	-170,88	-164,39
Suicide mortality rates																	
Without last 3 months	(0,1,1)(1,0,0)[12]	-0.3463	-4.07	0.0128	-6.56	0.01	10.90	0.9761	0.02	0.03	10.07	0.03	0.03	12.75	7.09	7.53	13.32
Without last 6 months	(0,1,1)(1,0,0)[12]	-0.3463	-4.07	0.0128	-6.56	0.01	10.90	0.9761	0.02	0.03	10.07	0.03	0.04	14.04	7.09	7.53	13.32
Death-by-suicide records																	
Without last 3 months	(0,1,1)(1,0,0)[12]	-0.4289	-4.07	0.0126	-6.53	0.01	10.93	0.9757	8.97	12.02	10.09	11.99	15.41	12.85	-287.56	-287.12	-281.32
Without last 6 months	(0,1,1)(1,0,0)[12]	-0.4289	-4.07	0.0126	-6.53	0.01	10.93	0.9757	8.97	12.02	10.09	13.05	16.34	14.24	-287.56	-287.12	-281.32

ADF = augmented Dickey–Fuller test; AIC = Akaike information criterion; AICc = corrected Akaike information criterion; BIC = Bayesian information criterion; MAE = mean absolute error; MAPE = mean absolute percentage error; RMSE: root mean squared error.
Sensitivity analysis excluding last 3 and last 6 months of each series.