Supplementary material: Forecasting infectious and parasitic disease emergency department attendances using high-dimensional time series data

I. Data Source

Table S1. List of predictive variables for 1-8 week ahead IPDs forecasts

Predictive Variable	Source
Infectious and Parasitic Diseases	Ministry of Health, Singapore
Not Categorised	Ministry of Health, Singapore
Respiratory Infection	Ministry of Health, Singapore
Maternal conditions	Ministry of Health, Singapore
Perinatal conditions	Ministry of Health, Singapore
Nutritional deficiencies	Ministry of Health, Singapore
Malignant neoplasms	Ministry of Health, Singapore
Other neoplasms	Ministry of Health, Singapore
Diabetes mellitus	Ministry of Health, Singapore
Endocrine disorders	Ministry of Health, Singapore
Mental disorders	Ministry of Health, Singapore
Neurological and sense disorders	Ministry of Health, Singapore
Cardiovascular disease	Ministry of Health, Singapore
Chronic respiratory disease	Ministry of Health, Singapore
Digestive disease	Ministry of Health, Singapore
Genitourinary disorders	Ministry of Health, Singapore
Skin diseases	Ministry of Health, Singapore
Musculoskeletal disease	Ministry of Health, Singapore
Congenital Abnormalities	Ministry of Health, Singapore
Oral Diseases	Ministry of Health, Singapore
Unintentional injuries	Ministry of Health, Singapore
Intentional injuries	Ministry of Health, Singapore
Ill-defined diseases	Ministry of Health, Singapore
Ill-defined injuries/accidents	Ministry of Health, Singapore
Factors influencing health status and contact with health services	Ministry of Health, Singapore
Maximum surface pressure	ERA5-Land
Mean surface pressure	ERA5-Land
Minimum surface pressure	ERA5-Land
Maximum level 1 soil temperature	ERA5-Land
Mean level 1 soil temperature	ERA5-Land
Minimum level 1 soil temperature	ERA5-Land
Maximum 2 meter dewpoint temperature	ERA5-Land
Mean 2 meter dewpoint temperature	ERA5-Land
Minimum 2 meter dewpoint temperature	ERA5-Land
Maximum vapor pressure	ERA5-Land
Mean vapor pressure	ERA5-Land
Minimum vapor pressure	ERA5-Land
Daily total rainfall	ERA5-Land
Mean temperature	ERA5-Land
Maximum temperature	ERA5-Land
Minimum temperature	ERA5-Land
Mean wind speed	ERA5-Land
Maximum wind speed	ERA5-Land

Mean relative humidity	ERA5-Land
Mean absolute humidity	ERA5-Land
PM2.5	National Environment Agency, Singapore
O3	National Environment Agency, Singapore
NO2	National Environment Agency, Singapore
SO2	National Environment Agency, Singapore
CO	National Environment Agency, Singapore

II. Model Evaluation

Table S2. Performance of different forecasting models (mean absolute percentage forecast error)

Forecast Horizon (Weeks Ahead)	RF	GBM	AR	AREV(LASSO)	LSTM-CNN	Naive	CombM	CombT	CombM(except L-C)	CombT(except L-C)
1	7.26	7.53	6.96	6.83	14.68	7.40	7.31	6.97	6.98	6.93
2	8.47	8.76	8.09	8.27	14.56	8.95	7.91	7.98	8.02	8.09
3	9.10	8.94	8.83	8.82	16.39	9.59	8.70	8.72	8.62	8.70
4	9.00	9.08	9.28	9.30	15.52	10.21	8.75	8.84	8.82	8.85
5	9.36	9.04	9.58	9.85	15.72	10.29	9.10	9.08	8.93	9.04
6	9.42	9.25	10.25	10.26	16.56	11.24	9.67	9.53	9.50	9.52
7	9.55	8.94	10.41	10.48	15.92	11.14	9.49	9.43	9.50	9.44
8	9.50	9.60	11.08	11.29	16.09	12.07	10.10	10.06	10.15	10.01

Table S3. Performance of different forecasting models (mean absolute scaled error)

Forecast Horizon (Weeks Ahead)	RF	GBM	AR	AREV(LASSO)	LSTM-CNN	Naive	CombM	CombT	CombM(except L-C)	CombT(except L-C)
1	0.98	1.01	0.94	0.93	2.12	1.00	1.00	0.94	0.94	0.93
2	0.94	0.99	0.91	0.94	1.76	1.00	0.91	0.90	0.90	0.91
3	0.95	0.94	0.93	0.93	1.82	1.00	0.93	0.92	0.91	0.91
4	0.90	0.91	0.92	0.94	1.66	1.00	0.89	0.89	0.88	0.88
5	0.91	0.89	0.94	0.98	1.67	1.00	0.91	0.90	0.88	0.89
6	0.83	0.83	0.91	0.92	1.59	1.00	0.87	0.85	0.85	0.84
7	0.87	0.83	0.93	0.96	1.56	1.00	0.87	0.86	0.87	0.86
8	0.80	0.81	0.92	0.94	1.45	1.00	0.86	0.85	0.85	0.84

Table S4. Performance of different forecasting models (mean absolute forecast error)

Forecast Horizon (Weeks Ahead)	RF	GBM	AR	AREV(LASSO)	LSTM-CNN	Naive	CombM	CombT	CombM(except L-C)	CombT(except L-C)
1	99.47	102.96	94.92	93.74	217.41	101.21	101.90	95.36	95.18	94.50
2	115.62	120.28	109.80	114.29	216.10	121.59	110.56	109.70	109.41	110.24
3	125.75	123.58	120.32	122.26	238.60	130.57	121.47	120.42	118.02	119.33
4	124.30	124.61	126.32	129.00	228.57	137.73	122.19	122.30	120.48	121.54
5	127.84	124.09	130.12	136.14	232.23	136.63	126.35	124.90	121.37	123.20
6	128.42	126.02	139.89	141.50	245.05	149.14	133.93	130.99	129.09	129.75
7	129.20	122.49	142.80	144.20	235.23	149.11	131.73	129.59	129.26	128.45
8	127.89	130.44	151.92	155.86	239.46	162.37	140.27	138.29	137.96	136.20

III. POST SELECTION

Table S5. Regression results of post-selection inference for fitting a linear model to the LASSO-selected subset for the 1–4 week ahead forecasting window. Values in parentheses indicate 95% confidence intervals. To make it easier to interpret the results, the exogenous variables selected by post-selection inference were linearly related to the dependent variable at the 5% significance level.

	Dependent variable: Infectious and Parasitic Diseases			
	1-week ahead (1)	2-week ahead (2)	3-week ahead (3)	4-week ahead (4)
Mean absolute humidity lag 3	2.47 (-13.52 , 18.45)	9.07 (-9.55 , 27.69)		
Cardiovascular disease lag 2			0.10 (-0.15 , 0.35)	
Cardiovascular disease lag 3	0.07 (-0.12 , 0.26)	-0.02 (-0.23 , 0.19)		0.04 (-0.20 , 0.27)
Cardiovascular disease lag 4			0.02 (-0.20 , 0.24)	
Chronic respiratory disease lag 4		0.07 (-0.15 , 0.29)		
Daily total rainfall lag 1	3.86*** (1.97 , 5.75)	-1.49 (-4.50 , 1.52)	1.14 (-1.76 , 4.04)	
Daily total rainfall lag 2				2.59 (-0.62 , 5.80)
Daily total rainfall lag 3			1.72 (-1.11 , 4.56)	1.03 (-2.54 , 4.60)
Daily total rainfall lag 4		1.99 (-0.57 , 4.55)	0.60 (-2.83 , 4.03)	
Diabetes mellitus lag 1		-1.15** (-2.13 , -0.18)		
Diabetes mellitus lag 2	-0.73* (-1.56 , 0.09)			
Diabetes mellitus lag 4		0.48 (-0.51 , 1.47)		
Factors influencing health status and contact with health services lag 1		-0.79*** (-1.39 , -0.19)		
Factors influencing health status and contact with health services lag 4			0.45 (-0.23 , 1.13)	0.68* (-0.02 , 1.37)
Genitourinary disorders lag 2	0.21 (-0.05 , 0.46)		-0.06 (-0.41 , 0.28)	0.16 (-0.19 , 0.52)
Genitourinary disorders lag 3			0.05 (-0.29 , 0.38)	
Genitourinary disorders lag 4		0.20 (-0.08 , 0.48)		
Ill-defined diseases lag 1		0.02		

		(-0.03 , 0.07)		
Ill-defined diseases lag 2	0.01 (-0.03 , 0.06)			
Ill-defined injuries/accidents lag 1				0.03*** (0.01 , 0.06)
Ill-defined injuries/accidents lag 2			0.03** (0.00 , 0.05)	
Infectious and Parasitic Diseases lag 1	0.66*** (0.57 , 0.75)	0.58*** (0.47 , 0.68)	0.35*** (0.25 , 0.45)	0.17*** (0.06 , 0.29)
Infectious and Parasitic Diseases lag 2	0.06 (-0.04 , 0.15)	-0.03 (-0.15 , 0.09)		
Infectious and Parasitic Diseases lag 3				0.10 (-0.03 , 0.23)
Infectious and Parasitic Diseases lag 4		-0.05 (-0.15 , 0.05)	0.07 (-0.02 , 0.16)	0.02 (-0.12 , 0.15)
Malignant neoplasms lag 1	-0.79* (-1.70 , 0.13)	-0.63 (-1.73 , 0.46)	-1.56** (-2.77 , -0.35)	-1.27** (-2.52 , -0.02)
Malignant neoplasms lag 2	-0.58 (-1.51 , 0.34)	-1.22** (-2.31 , -0.13)	-1.00 (-2.23 , 0.22)	-1.88*** (-3.16 , -0.61)
Malignant neoplasms lag 3	-0.81* (-1.72 , 0.09)	-0.85 (-1.95 , 0.26)	-1.34** (-2.56 , -0.12)	-1.17* (-2.42 , 0.07)
Malignant neoplasms lag 4		-0.64 (-1.71 , 0.44)	-0.45 (-1.65 , 0.75)	
Maternal conditions lag 1	-0.07 (-0.73 , 0.58)			0.08 (-0.91 , 1.07)
Maternal conditions lag 2			-0.06 (-0.99 , 0.87)	
Maternal conditions lag 3		0.12 (-0.59 , 0.82)		-0.08 (-1.27 , 1.11)
Maternal conditions lag 4	0.11 (-0.55 , 0.78)		0.24 (-0.71 , 1.19)	-0.13 (-1.22 , 0.95)
Max wind speed lag 4		4.26** (0.27 , 8.25)		
Maximum temperature lag 2		16.91** (3.65 , 30.17)		
Maximum temperature lag 3	11.19* (-0.36 , 22.74)			
Mean wind speed lag 1			-6.22 (-17.54 , 5.10)	-12.19** (-23.52 , -0.86)
Mean wind speed lag 2			-3.88 (-15.04 , 7.27)	-2.79 (-15.45 , 9.87)

Mean wind speed lag 3		-6.11 (-16.01 , 3.79)		5.72 (-7.93 , 19.37)
Mean wind speed lag 4	0.26 (-9.01 , 9.53)			
Mental disorders lag 2		0.15 (-0.10 , 0.41)		0.11 (-0.33 , 0.54)
Mental disorders lag 3	0.06 (-0.15 , 0.27)		0.19 (-0.08 , 0.47)	0.02 (-0.42 , 0.46)
Minimum temperature lag 1		-52.92*** (-73.53 , -32.32)		
Minimum temperature lag 2	-31.90*** (-46.79 , -17.02)			
Musculoskeletal disease lag 1			0.03 (-0.14 , 0.21)	
Musculoskeletal disease lag 2		0.08 (-0.06 , 0.23)	-0.14 (-0.35 , 0.07)	
Musculoskeletal disease lag 3	-0.02 (-0.14 , 0.11)			
Musculoskeletal disease lag 4				-0.10 (-0.27 , 0.07)
Neurological and sense disorders lag 1				0.11 (-0.17 , 0.39)
Neurological and sense disorders lag 2			0.24** (0.01 , 0.47)	0.06 (-0.23 , 0.34)
Neurological and sense disorders lag 3		0.16 (-0.09 , 0.40)		
Neurological and sense disorders lag 4	0.23*** (0.06 , 0.40)	0.15 (-0.08 , 0.39)		
Not Categorised lag 1				0.12** (0.00 , 0.24)
Not Categorised lag 2			0.12** (0.01 , 0.24)	
Not Categorised lag 3	0.09** (0.00 , 0.18)	0.11** (0.01 , 0.21)		
Nutritional deficiencies lag 1				1.27* (-0.01 , 2.56)
Nutritional deficiencies lag 3		0.52 (-0.66 , 1.69)		1.66** (0.32 , 3.01)
Nutritional deficiencies lag 4	1.06** (0.16 , 1.96)	0.96* (-0.17 , 2.09)	1.92*** (0.71 , 3.13)	
Oral Diseases lag 1	-1.43***	-1.31***	-1.03*	

	(-2.24 , -0.63)	(-2.24 , -0.37)	(-2.08 , 0.01)	
Oral Diseases lag 4				0.59 (-0.50 , 1.69)
Other neoplasms lag 1				0.99 (-1.78 , 3.75)
Other neoplasms lag 2			1.27 (-1.38 , 3.92)	
Other neoplasms lag 3		2.32* (-0.07 , 4.72)	0.84 (-1.79 , 3.46)	
Other neoplasms lag 4	1.56 (-0.48 , 3.59)	0.33 (-2.05 , 2.72)		1.64 (-1.13 , 4.41)
Mean relative humidity lag 3				3.93 (-1.32 , 9.19)
Mean relative humidity lag 4	3.51* (-0.24 , 7.26)		3.38 (-1.28 , 8.05)	
Respiratory infection lag 4	0.01 (-0.01 , 0.03)	0.02 (-0.01 , 0.04)		
Skin diseases lag 1				0.20 (-0.12 , 0.52)
Skin diseases lag 2	0.11 (-0.12 , 0.33)	0.10 (-0.18 , 0.37)	0.32** (0.02 , 0.62)	0.25 (-0.07 , 0.56)
Skin diseases lag 3		0.15 (-0.11 , 0.41)	0.18 (-0.11 , 0.48)	
Skin diseases lag 4	0.06 (-0.16 , 0.28)			0.20 (-0.11 , 0.51)
CO lag 3	-53.32 (-134.13 , 27.49)	-203.07** (-374.10 , -32.05)		
CO lag 4	-198.01** (-350.12 , -45.90)			
Const	-2244.97 (-8680.01 , 4190.07)	-16418.52** (-29080.67 , -3756.37)	-517.73 (-8802.23 , 7766.78)	-3819.03 (-12176.39 , 4538.33)
NO_2 lag 1	0.67 (-1.21 , 2.54)			
NO_2 lag 3			0.57 (-2.36 , 3.50)	0.69 (-2.45 , 3.84)
NO_2 lag 4		0.59 (-1.90 , 3.07)	-0.16 (-3.06 , 2.74)	
O_3 lag 1		-0.77 (-2.56 , 1.02)	-2.25** (-4.30 , -0.20)	-2.82** (-5.01 , -0.63)
O_3 lag 2	-0.59 (-2.07 , 0.88)	-2.38** (-4.32 , -0.43)	-1.60 (-3.87 , 0.68)	-1.22 (-3.52 , 1.09)

O_3 lag 3	-1.17 (-2.89 , 0.55)	-1.66 (-3.79 , 0.47)	-0.90 (-3.08 , 1.27)	-0.88 (-3.13 , 1.38)
O_3 lag 4	-0.88 (-2.57 , 0.81)	-1.04 (-2.88 , 0.80)	-0.24 (-2.31 , 1.84)	
$PM_{2.5}$ lag 1				-0.93 (-2.23 , 0.37)
$PM_{2.5}$ lag 2			-1.14* (-2.35 , 0.07)	
$PM_{2.5}$ lag 3		1.48 (-0.58 , 3.53)		-0.82 (-2.17 , 0.53)
PM_{25} lag 4	1.97** (0.11 , 3.83)			
Max surface pressure lag 4		-764.03 (-6902.53 , 5374.47)		
Mean surface pressure lag 4		1145.77 (-11148.55 , 13440.10)		
Min surface pressure lag 4		-381.62 (-6546.86 , 5783.63)		
Max level 1 soil temperature lag 1				9814.04 (-20496.28 , 40124.37)
Max level 1 soil temperature lag 2			2.64 (-24.39 , 29.68)	
Max level 1 soil temperature lag 3		15.70 (-9.71 , 41.11)		
Max level 1 soil temperature lag 4	-1216.93 (-12275.29 , 9841.42)			
Mean level 1 soil temperature lag 1				-9801.00 (-40105.57 , 20503.57)
Min level 1 soil temperature lag 4	1225.28 (-9832.13 , 12282.68)			
Observations	517	516	515	514
R^2	0.82	0.77	0.70	0.68
Adjusted R^2	0.81	0.74	0.68	0.65
Residual Std. Error	94.87 (df=480)	110.15 (df=469)	123.63 (df=475)	128.35 (df=472)
F Statistic	61.96*** (df=36; 480)	33.42*** (df=46; 469)	28.59*** (df=39; 475)	24.37*** (df=41; 472)
Note:				*p<0.1; **p<0.05; ***p<0.01

Table S6. Regression results of post-selection inference for fitting a linear model to the LASSO-selected subset for the 5–8 week ahead forecasting window. Values in parentheses indicate 95% confidence intervals. To make it easier to interpret the results, the exogenous variables selected by post-selection inference were linearly related to the dependent variable at the 5% significance level.

	Dependent variable: Infectious and Parasitic Diseases			
	5-week ahead	6-week ahead	7-week ahead	8-week ahead
	(1)	(2)	(3)	(4)
AH_lag_1		16.77	3.03	9.70
		(-12.21 , 45.75)	(-21.22 , 27.27)	(-15.24 , 34.65)
Cardiovascular disease lag 2	0.01			
	(-0.24 , 0.26)			
Chronic respiratory disease lag 1	-0.13		0.22	0.17
	(-0.44 , 0.18)		(-0.07 , 0.50)	(-0.11 , 0.45)
Chronic respiratory disease lag 3	0.04			
	(-0.24 , 0.32)			
Congenital Abnormalities lag 1		-3.11		
		(-6.90 , 0.67)		
Congenital Abnormalities lag 2	-2.59			
	(-6.26 , 1.07)			
Daily total rainfall lag 1	0.22	-0.35	2.63	
	(-3.58 , 4.03)	(-4.50 , 3.80)	(-0.89 , 6.15)	
Daily total rainfall lag 2	0.05	1.29		
	(-4.08 , 4.18)	(-2.78 , 5.37)		
Daily total rainfall lag 3	0.97			
	(-2.91 , 4.85)			
Factors influencing health status and contact with health services lag 2		0.23		
		(-0.59 , 1.05)		
Factors influencing health status and contact with health services lag 3	0.50			
	(-0.24 , 1.25)			
Factors influencing health status and contact with health services lag 4		0.19		0.61
		(-0.62 , 1.01)		(-0.23 , 1.44)
Genitourinary disorders lag 1	0.20			
	(-0.19 , 0.60)			
Genitourinary disorders lag 2		0.07	0.06	
		(-0.34 , 0.48)	(-0.34 , 0.46)	
Genitourinary disorders lag 3	0.05	-0.05		
	(-0.34 , 0.44)	(-0.43 , 0.33)		
Genitourinary disorders lag 4	0.02	-0.04	0.05	
	(-0.33 , 0.38)	(-0.41 , 0.33)	(-0.33 , 0.42)	
Ill-defined injuries/accidents lag 1	0.03**	0.01		0.04**

	(0.00 , 0.07)	(-0.11 , 0.13)		(0.01 , 0.07)
Ill-defined injuries/accidents lag 2		0.02 (-0.12 , 0.16)		
Ill-defined injuries/accidents lag 4		0.01 (-0.09 , 0.11)		
Infectious and Parasitic Diseases lag 1	0.14** (0.00 , 0.29)	0.18** (0.04 , 0.32)	0.23*** (0.11 , 0.36)	0.08 (-0.09 , 0.24)
Infectious and Parasitic Diseases lag 2	0.09 (-0.08 , 0.26)	0.04 (-0.10 , 0.18)		0.02 (-0.19 , 0.23)
Infectious and Parasitic Diseases lag 3	0.01 (-0.15 , 0.17)			0.04 (-0.16 , 0.25)
Infectious and Parasitic Diseases lag 4			-0.00 (-0.13 , 0.12)	0.03 (-0.13 , 0.18)
Malignant neoplasms lag 1	-1.83*** (-3.15 , -0.52)	-1.23* (-2.58 , 0.12)		
Malignant neoplasms lag 2	-1.49** (-2.79 , -0.18)	-0.45 (-1.79 , 0.90)	-0.70 (-2.12 , 0.72)	-1.27* (-2.72 , 0.19)
Malignant neoplasms lag 3		-0.55 (-1.91 , 0.81)	-1.02 (-2.44 , 0.39)	-1.67** (-3.13 , -0.21)
Malignant neoplasms lag 4		-0.72 (-2.08 , 0.64)	-1.12 (-2.55 , 0.30)	-1.00 (-2.46 , 0.46)
Maternal conditions lag 1	-0.23 (-1.39 , 0.93)	0.08 (-0.83 , 0.99)	0.50 (-0.70 , 1.71)	0.73 (-0.41 , 1.88)
Maternal conditions lag 2	0.04 (-1.25 , 1.32)		-0.16 (-1.48 , 1.17)	
Maternal conditions lag 3	-0.19 (-1.34 , 0.96)			-0.10 (-1.26 , 1.05)
Maternal conditions lag 4			0.32 (-0.77 , 1.41)	
Max wind speed lag 3			-2.49 (-7.63 , 2.66)	-3.94 (-9.08 , 1.20)
Max wind speed lag 4		-2.42 (-7.13 , 2.29)	-3.55 (-8.49 , 1.38)	-6.75** (-12.08 , -1.41)
Maximum temperature lag 3				11.67 (-7.28 , 30.61)
Maximum temperature lag 4			5.69 (-13.45 , 24.83)	3.77 (-19.32 , 26.85)
Mean wind speed lag 1	-3.58 (-18.09 , 10.93)	-7.87 (-23.33 , 7.60)	-1.12 (-16.78 , 14.53)	-2.09 (-17.35 , 13.18)
Mean wind speed lag 2	-1.91 (-16.69 , 12.86)		0.11 (-12.30 , 12.52)	-8.55 (-22.46 , 5.37)

Mental disorders lag 1	0.02 (-0.46 , 0.50)	0.06 (-0.28 , 0.40)		
Mental disorders lag 2	0.02 (-0.46 , 0.49)			
Minimum temperature lag 1	-32.35** (-61.80 , -2.90)	-29.64* (-63.35 , 4.06)		
Minimum temperature lag 2	-22.32 (-51.15 , 6.50)			
Minimum temperature lag 4				2.71 (-23.29 , 28.71)
Musculoskeletal disease lag 1			0.11 (-0.10 , 0.33)	-0.13 (-0.34 , 0.09)
Musculoskeletal disease lag 2		0.01 (-0.17 , 0.20)	-0.02 (-0.24 , 0.19)	
Musculoskeletal disease lag 3	-0.01 (-0.21 , 0.18)			-0.04 (-0.25 , 0.16)
Neurological and sense disorders lag 1	0.07 (-0.23 , 0.38)	0.17 (-0.10 , 0.44)	-0.02 (-0.30 , 0.26)	
Neurological and sense disorders lag 2	0.12 (-0.18 , 0.41)			
Neurological and sense disorders lag 3				0.05 (-0.29 , 0.38)
Neurological and sense disorders lag 4				0.04 (-0.27 , 0.35)
Not Categorised lag 1	0.09 (-0.04 , 0.22)			0.09 (-0.07 , 0.24)
Not Categorised lag 2				0.04 (-0.13 , 0.21)
Not Categorised lag 3		0.10 (-0.04 , 0.24)	0.10 (-0.04 , 0.25)	0.06 (-0.10 , 0.23)
Not Categorised lag 4	0.08 (-0.04 , 0.21)	0.10 (-0.03 , 0.24)	0.11 (-0.04 , 0.25)	0.13 (-0.03 , 0.28)
Nutritional deficiencies lag 1	1.45* (-0.01 , 2.90)	1.95** (0.47 , 3.43)	1.39** (0.15 , 2.63)	1.36* (-0.17 , 2.88)
Nutritional deficiencies lag 2	1.88** (0.42 , 3.33)	0.91 (-0.52 , 2.34)		1.49* (-0.01 , 3.00)
Oral Diseases lag 3	0.45 (-0.70 , 1.59)	0.44 (-0.71 , 1.60)		0.66 (-0.67 , 1.98)
Oral Diseases lag 4		0.55 (-0.66 , 1.75)	0.72 (-0.55 , 1.99)	1.25* (-0.02 , 2.53)
Other neoplasms lag 1			1.37	2.14

			(-1.83 , 4.57)	(-1.13 , 5.42)
Other neoplasms lag 2		1.14 (-1.86 , 4.15)	2.81* (-0.32 , 5.94)	1.29 (-1.98 , 4.55)
Other neoplasms lag 3	2.04 (-0.84 , 4.91)	3.18** (0.23 , 6.13)	2.75* (-0.43 , 5.93)	
Other neoplasms lag 4	2.78* (-0.14 , 5.69)	2.36 (-0.68 , 5.39)		
Perinatal conditions lag 2				0.15 (-0.59 , 0.88)
Perinatal conditions lag 3			0.57* (-0.07 , 1.21)	0.09 (-0.65 , 0.84)
Perinatal conditions lag 4	0.38 (-0.18 , 0.95)	0.46 (-0.14 , 1.07)	0.23 (-0.43 , 0.90)	
RH lag 2	1.52 (-4.58 , 7.63)	0.00 (-5.64 , 5.65)		
RH lag 3	2.13 (-3.03 , 7.29)			
Respiratory infection lag 1		0.03** (0.00 , 0.06)		
Respiratory infection lag 2	0.02 (-0.04 , 0.07)			
Respiratory infection lag 3	0.01 (-0.05 , 0.07)			
Skin diseases lag 1	0.31* (-0.03 , 0.65)		0.18 (-0.19 , 0.55)	0.45** (0.06 , 0.84)
Skin diseases lag 2		0.33* (-0.03 , 0.68)	0.24 (-0.11 , 0.59)	0.23 (-0.16 , 0.62)
Skin diseases lag 3	0.19 (-0.16 , 0.55)	0.17 (-0.18 , 0.51)	-0.00 (-0.34 , 0.34)	0.05 (-0.37 , 0.46)
Skin diseases lag 4	0.08 (-0.25 , 0.41)	-0.01 (-0.37 , 0.35)	-0.02 (-0.39 , 0.36)	
CO lag 4			-41.76 (-255.96 , 172.44)	
Const	-12768.68** (-24185.10 , -1352.27)	-4326.64 (-14377.02 , 5723.74)	-5990.38 (-16420.03 , 4439.27)	-15226.48* (-32580.54 , 2127.58)
Max vapor pressure lag 4	-333582.99 (-789397.99 , 122232.02)			
NO_2 lag 1	1.10 (-2.24 , 4.43)	0.72 (-2.79 , 4.23)	1.46 (-2.24 , 5.15)	1.09 (-2.87 , 5.04)
NO_2 lag 2				-0.00

				(-3.95 , 3.94)
NO_2 lag 3			0.18	
			(-3.04 , 3.40)	
O_3lag 1	-3.08**	-2.03	-2.65**	-2.85**
	(-5.44 , -0.72)	(-4.52 , 0.47)	(-5.04 , -0.26)	(-5.11 , -0.59)
O_3 lag 2	-0.94	-1.09		
	(-3.33 , 1.45)	(-3.48 , 1.31)		
O_3 lag 4			1.09	1.93
			(-1.19 , 3.38)	(-0.43 , 4.30)
$PM_{2.5}$ lag 1	-0.06	-1.15	-1.44*	
	(-1.69 , 1.57)	(-2.64 , 0.34)	(-2.98 , 0.11)	
$PM_{2.5}$ lag 2	-0.73			
	(-2.28 , 0.81)			
$PM_{2.5}$ lag 4		1.30**	1.61	0.60
		(0.03 , 2.57)	(-1.12 , 4.34)	(-0.81 , 2.01)
Max surface pressure lag 4				841.29
				(-7519.25 , 9201.84)
Mean surface pressure lag 4				-1814.69
				(-18551.37 , 14921.99)
Min surface pressure lag 4				973.54
				(-7415.44 , 9362.53)
Max level 1 soil temperature lag 1	-177261.73	-239534.52	83270.86	71610.12
	(-877042.07 , 522518.62)	(-957340.36 , 478271.32)	(-664608.72 , 831150.45)	(-685897.11 , 829117.35)
Mean level 1 soil temperature lag 1	359035.26	481534.13	-174499.39	-141122.51
	(-1068391.08 , 1786461.60)	(-983240.21 , 1946308.46)	(-1701646.06 , 1352647.27)	(-1687780.15 , 1405535.12)
Min level 1 soil temperature lag 1	-181727.07	-241982.66	91249.12	69514.73
	(-909750.69 , 546296.55)	(-989340.26 , 505374.95)	(-688405.21 , 870903.46)	(-720045.52 , 859074.99)
Observations	513	512	511	510
R^2	0.67	0.64	0.59	0.58
Adjusted R^2	0.63	0.60	0.56	0.54
Residual Std. Error	132.55 (df=459)	137.51 (df=463)	144.44 (df=466)	147.31 (df=459)
F Statistic	17.25*** (df=53; 459)	16.86*** (df=48; 463)	15.52*** (df=44; 466)	12.85*** (df=50; 459)
Note:				*p<0.1; **p<0.05; ***p<0.01

IV. VISUALIZATION

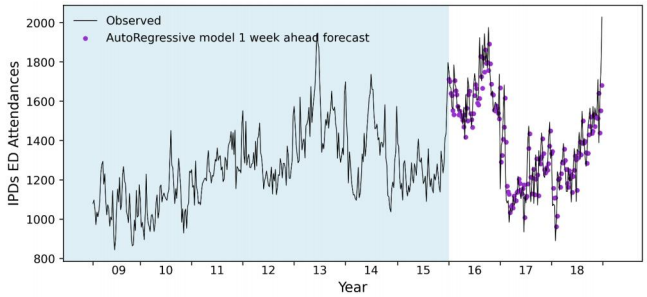

Figure S1: Visualization of IPDs ED attendance case counts versus 1-week ahead forecasts from the AutoRegressive model, using past IPDs ED attendances of up to 4 weeks lag as predictors.

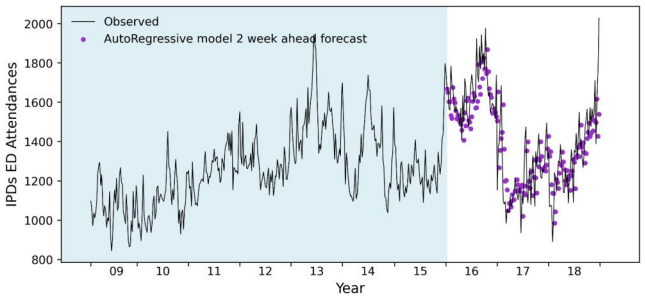

Figure S2: Visualization of IPDs ED attendance case counts versus 2-week ahead forecasts from the AutoRegressive model, using past IPDs ED attendances of up to 4 weeks lag as predictors.

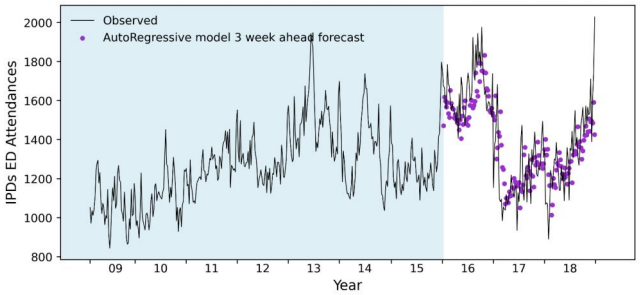

Figure S3: Visualization of IPDs ED attendance case counts versus 3-week ahead forecasts from the AutoRegressive model, using past IPDs ED attendances of up to 4 weeks lag as predictors.

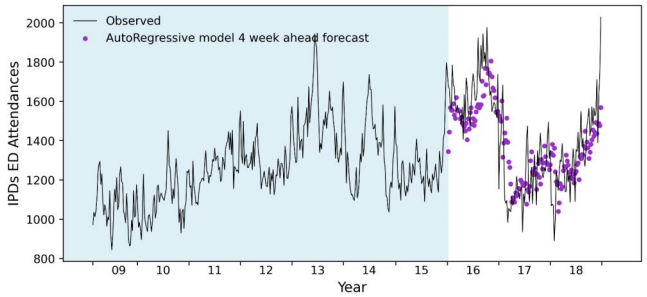

Figure S4: Visualization of IPDs ED attendance case counts versus 4-week ahead forecasts from the AutoRegressive model, using past IPDs ED attendances of up to 4 weeks lag as predictors.

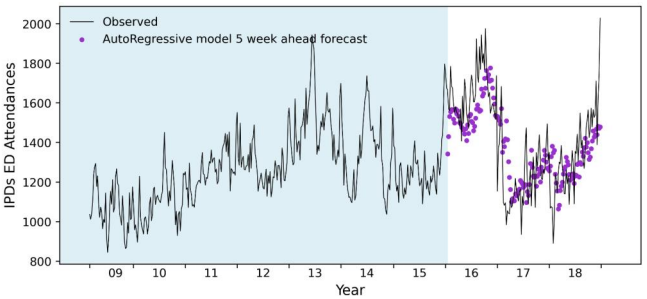

Figure S5: Visualization of IPDs ED attendance case counts versus 5-week ahead forecasts from the AutoRegressive model, using past IPDs ED attendances of up to 4 weeks lag as predictors.

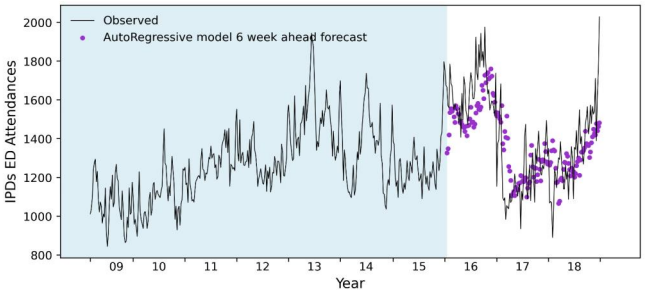

Figure S6: Visualization of IPDs ED attendance case counts versus 6-week ahead forecasts from the AutoRegressive model, using past IPDs ED attendances of up to 4 weeks lag as predictors.

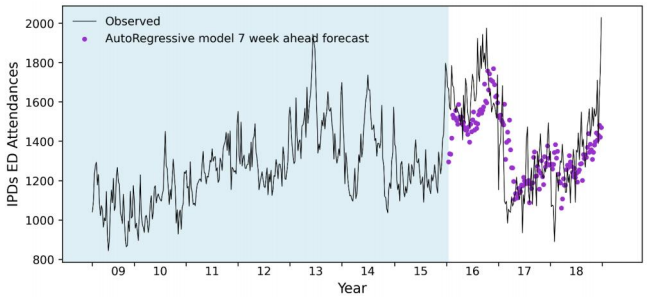

Figure S7: Visualization of IPDs ED attendance case counts versus 7-week ahead forecasts from the AutoRegressive model, using past IPDs ED attendances of up to 4 weeks lag as predictors.

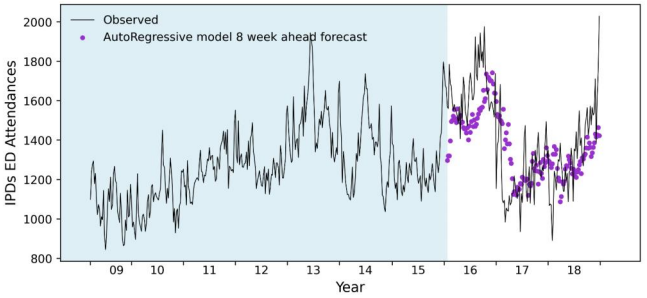

Figure S8: Visualization of IPDs ED attendance case counts versus 8-week ahead forecasts from the AutoRegressive model, using past IPDs ED attendances of up to 4 weeks lag as predictors.

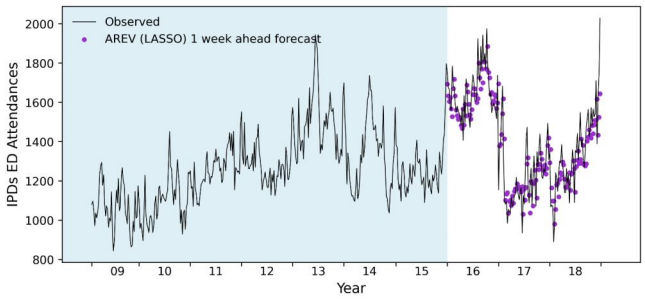

Figure S9: Visualization of IPDs ED attendance case counts versus 1-week ahead forecasts from the AutoRegression with Exogenous Variables using LASSO, with all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

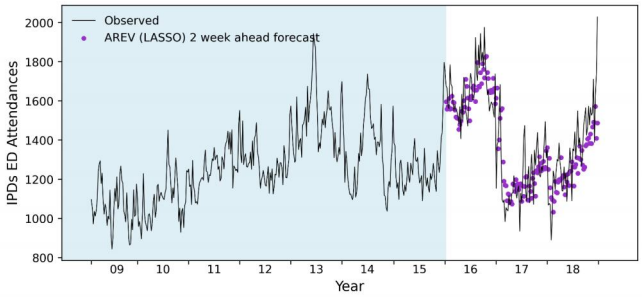

Figure S10: Visualization of IPDs ED attendance case counts versus 2-week ahead forecasts from the AutoRegression with Exogenous Variables using LASSO, with all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

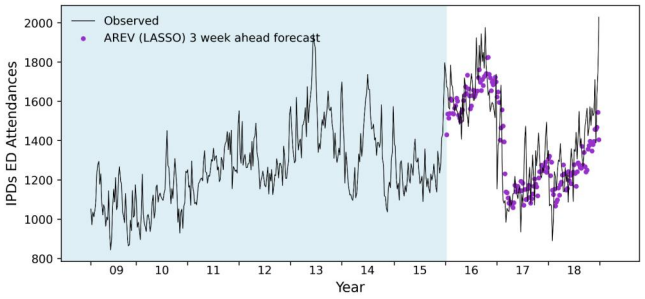

Figure 11S: Visualization of IPDs ED attendance case counts versus 3-week ahead forecasts from the AutoRegression with Exogenous Variables using LASSO, with all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

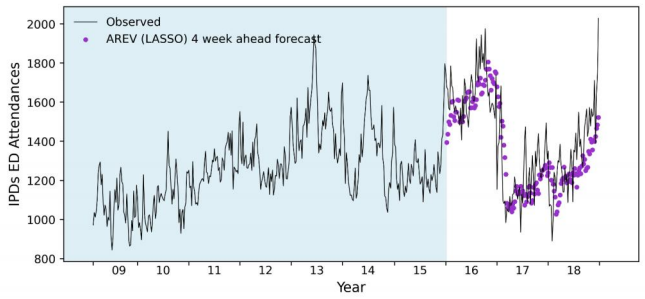

Figure S12: Visualization of IPDs ED attendance case counts versus 4-week ahead forecasts from the AutoRegression with Exogenous Variables using LASSO, with all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

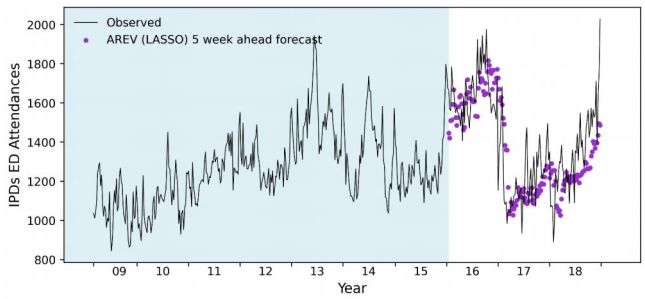

Figure S13: Visualization of IPDs ED attendance case counts versus 5-week ahead forecasts from the AutoRegression with Exogenous Variables using LASSO, with all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

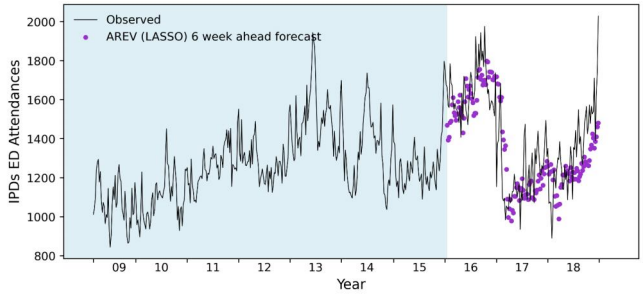

Figure S14: Visualization of IPDs ED attendance case counts versus 6-week ahead forecasts from the AutoRegression with Exogenous Variables using LASSO, with all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

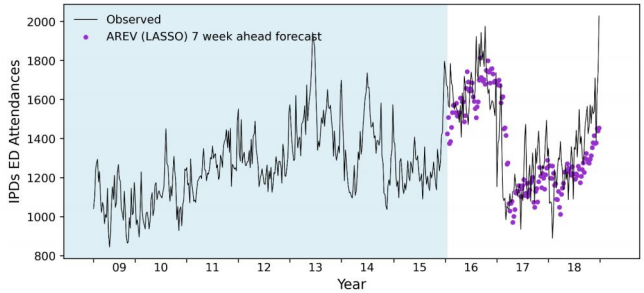

Figure S15: Visualization of IPDs ED attendance case counts versus 7-week ahead forecasts from the AutoRegression with Exogenous Variables using LASSO, with all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

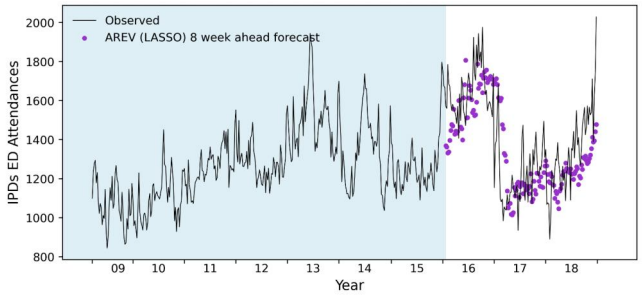

Figure S16: Visualization of IPDs ED attendance case counts versus 8-week ahead forecasts from the AutoRegression with Exogenous Variables using LASSO, with all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

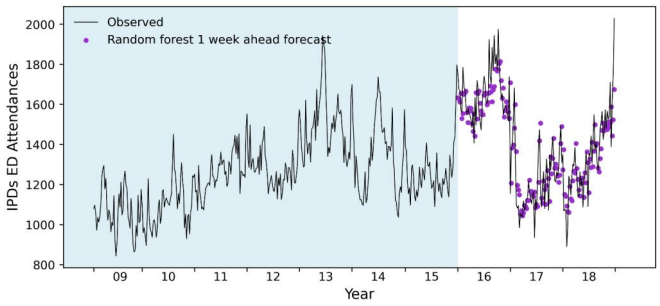

Figure S17: Visualization of IPDs ED attendance case counts versus 1-week ahead forecasts from random forest, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

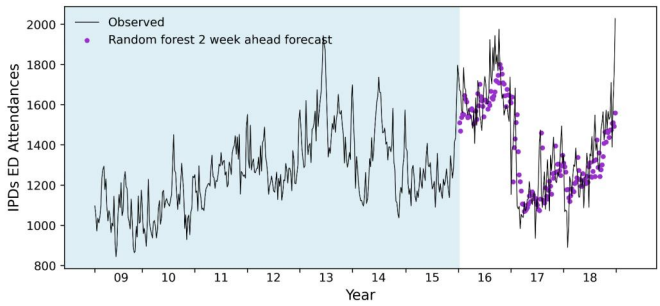

Figure S18: Visualization of IPDs ED attendance case counts versus 2-week ahead forecasts from random forest, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

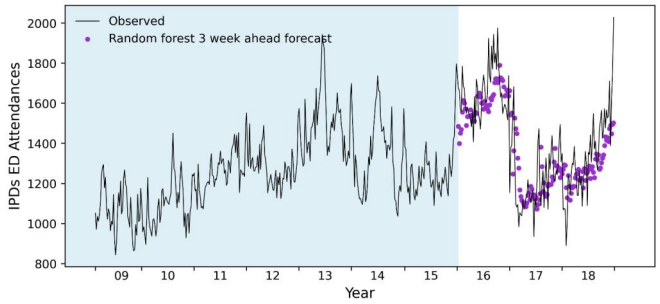

Figure S19: Visualization of IPDs ED attendance case counts versus 3-week ahead forecasts from random forest, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

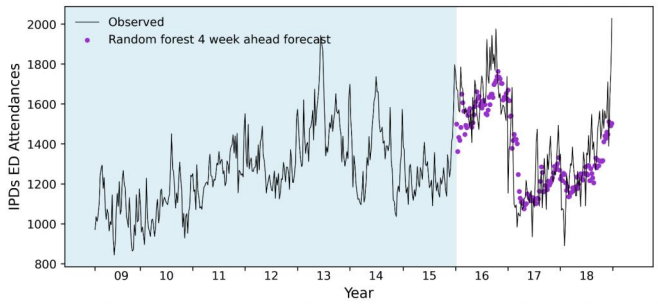

Figure S20: Visualization of IPDs ED attendance case counts versus 4-week ahead forecasts from random forest, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

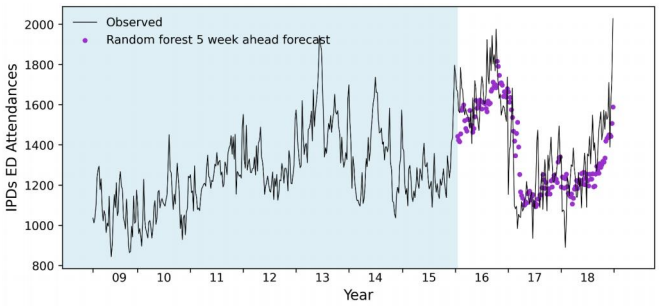

Figure S21: Visualization of IPDs ED attendance case counts versus 5-week ahead forecasts from random forest, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

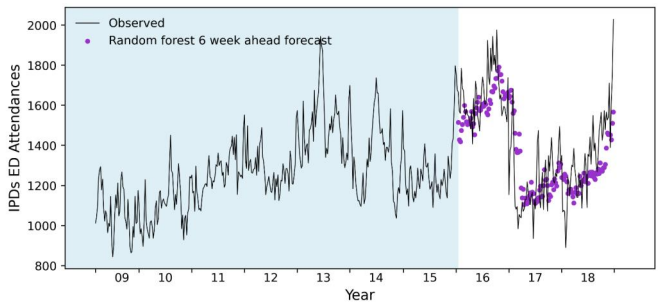

Figure S22: Visualization of IPDs ED attendance case counts versus 6-week ahead forecasts from random forest, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

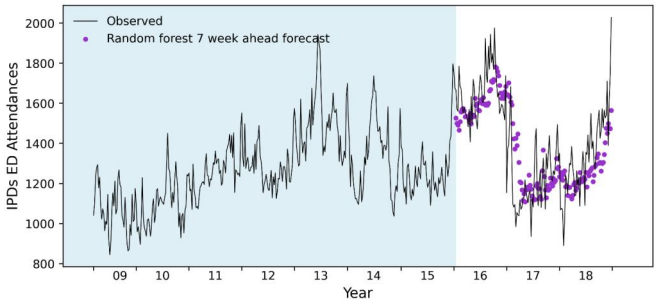

Figure S23: Visualization of IPDs ED attendance case counts versus 7-week ahead forecasts from random forest, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

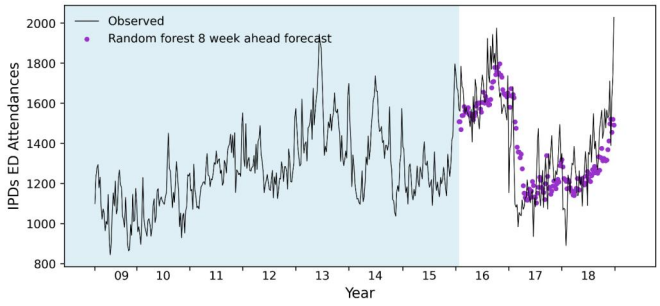

Figure S24: Visualization of IPDs ED attendance case counts versus 8-week ahead forecasts from random forest, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

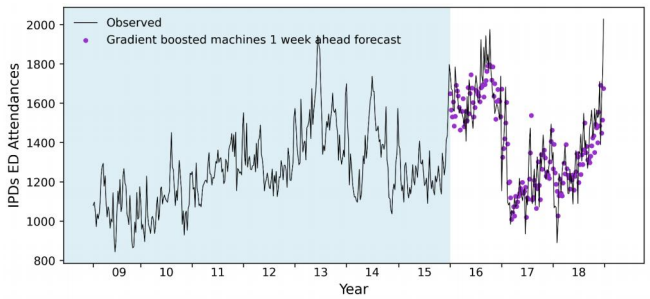

Figure S25: Visualization of IPDs ED attendance case counts versus 1-week ahead forecasts from gradient boosted machines, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

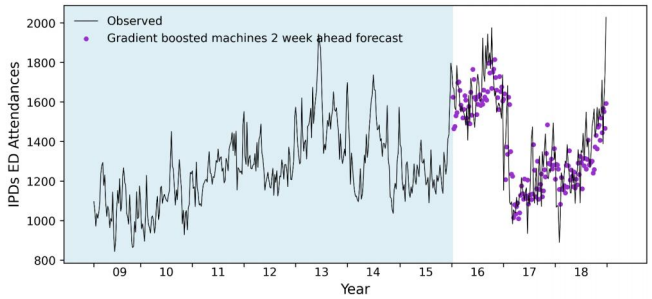

Figure S26: Visualization of IPDs ED attendance case counts versus 2-week ahead forecasts from gradient boosted machines, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

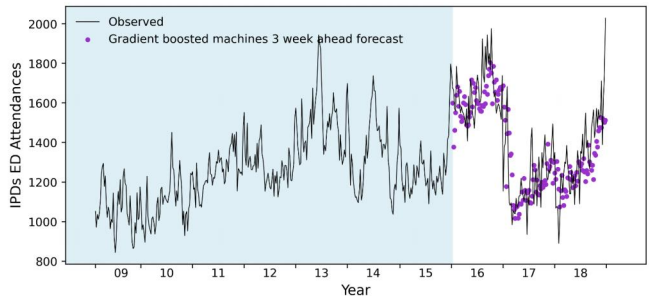

Figure S27: Visualization of IPDs ED attendance case counts versus 3-week ahead forecasts from gradient boosted machines, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

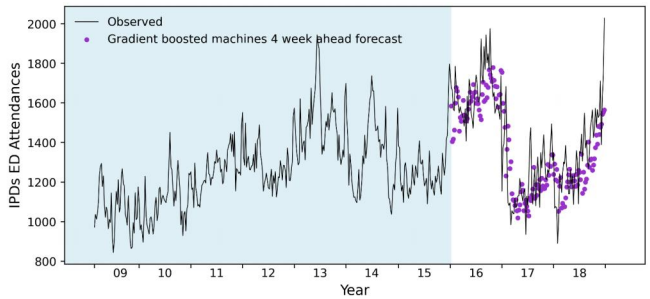

Figure S28: Visualization of IPDs ED attendance case counts versus 4-week ahead forecasts from gradient boosted machines, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

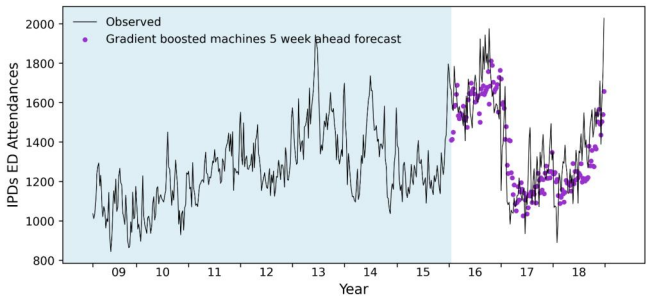

Figure S29: Visualization of IPDs ED attendance case counts versus 5-week ahead forecasts from gradient boosted machines, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

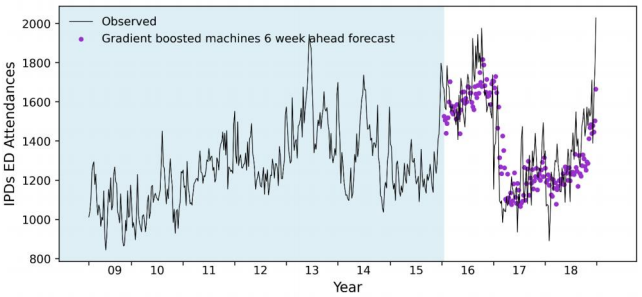

Figure S30: Visualization of IPDs ED attendance case counts versus 6-week ahead forecasts from gradient boosted machines, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

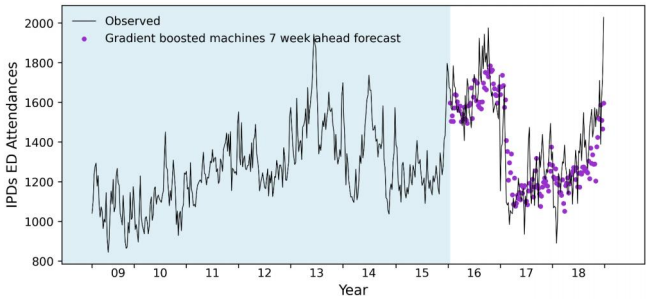

Figure S31: Visualization of IPDs ED attendance case counts versus 7-week ahead forecasts from gradient boosted machines, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

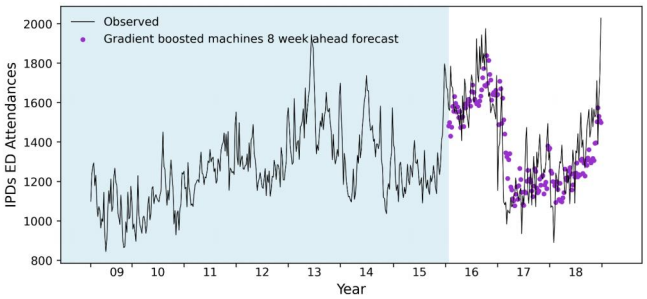

Figure S32: Visualization of IPDs ED attendance case counts versus 8-week ahead forecasts from gradient boosted machines, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

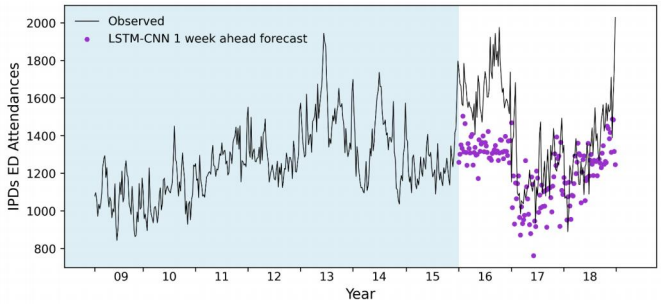

Figure S33: Visualization of IPDs ED attendance case counts versus 1-week ahead forecasts from LSTM-CNN, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

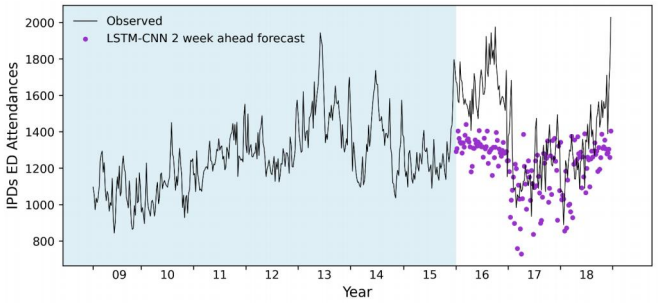

Figure S34: Visualization of IPDs ED attendance case counts versus 2-week ahead forecasts from LSTM-CNN, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

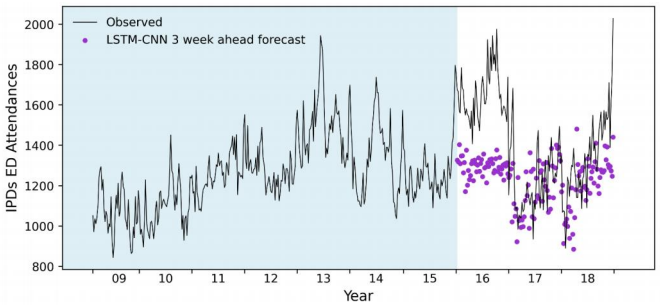

Figure S35: Visualization of IPDs ED attendance case counts versus 3-week ahead forecasts from LSTM-CNN, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

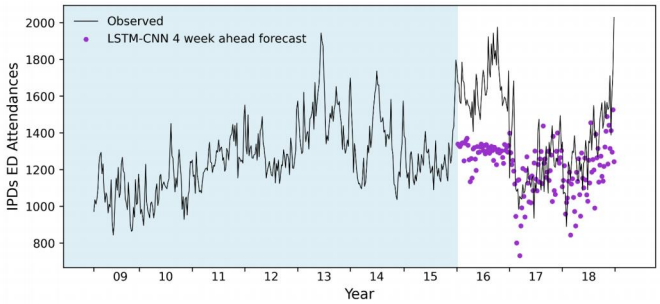

Figure S36: Visualization of IPDs ED attendance case counts versus 4-week ahead forecasts from LSTM-CNN, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

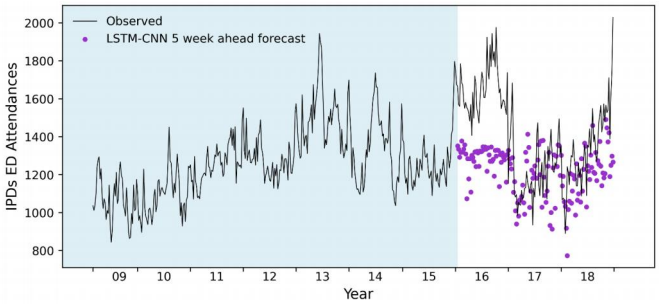

Figure S37: Visualization of IPDs ED attendance case counts versus 5-week ahead forecasts from LSTM-CNN, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

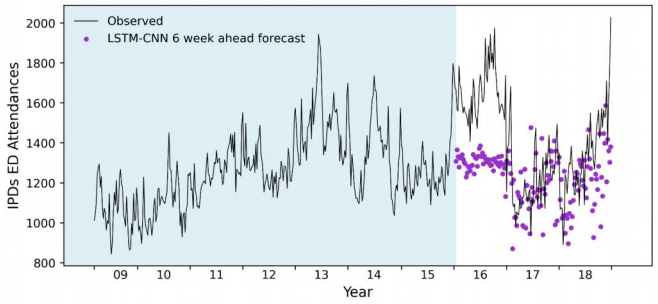

Figure S38: Visualization of IPDs ED attendance case counts versus 6-week ahead forecasts from LSTM-CNN, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

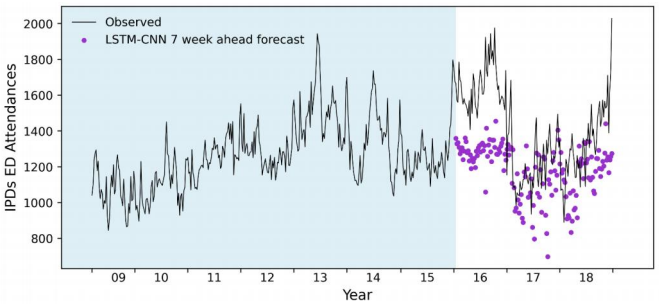

Figure S39: Visualization of IPDs ED attendance case counts versus 7-week ahead forecasts from LSTM-CNN, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

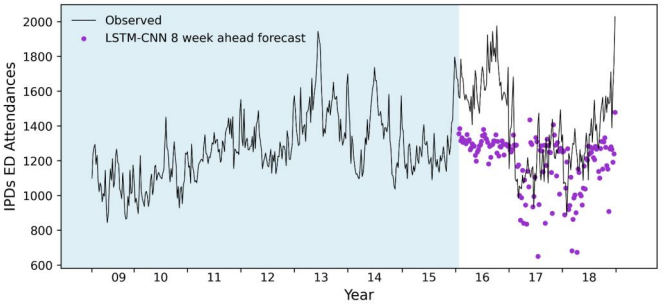

Figure S40: Visualization of IPDs ED attendance case counts versus 8-week ahead forecasts from LSTM-CNN, using all Singapore burden of disease categories and environmental covariates of up to 4 weeks lag as predictors.

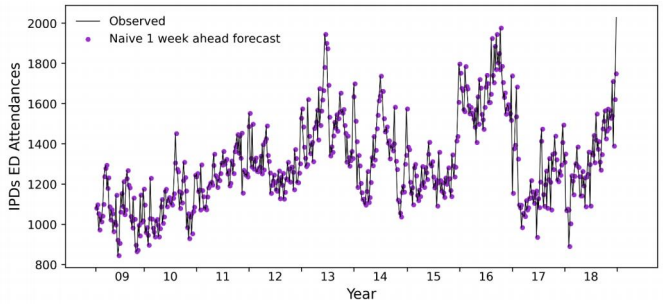

Figure S41: Visualization of IPDs ED attendance case counts versus 1-week ahead naïve forecasts (taking the latest available observation of URTI case counts at the contemporaneous time point as the 1-step ahead forecast)

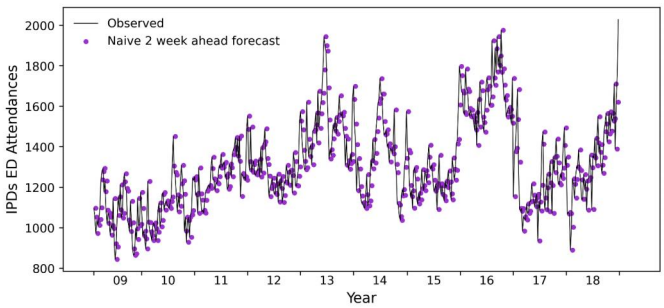

Figure S42: Visualization of IPDs ED attendance case counts versus 2-week ahead naïve forecasts (taking the latest available observation of URTI case counts at the contemporaneous time point as the 2-step ahead forecast)

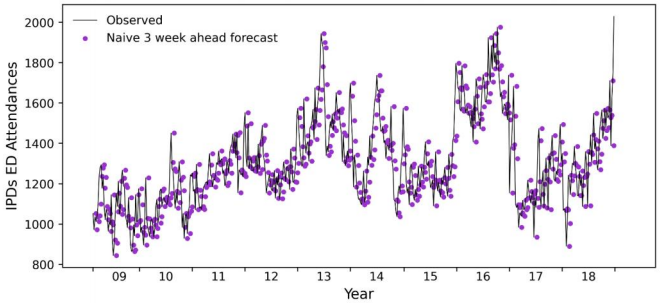

Figure S43: Visualization of IPDs ED attendance case counts versus 3-week ahead naïve forecasts (taking the latest available observation of URTI case counts at the contemporaneous time point as the 3-step ahead forecast)

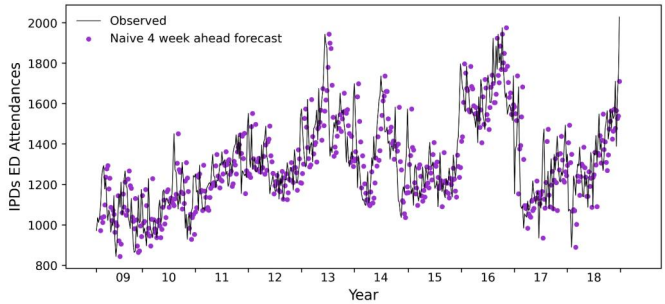

Figure S44: Visualization of IPDs ED attendance case counts versus 4-week ahead naïve forecasts (taking the latest available observation of URTI case counts at the contemporaneous time point as the 4-step ahead forecast)

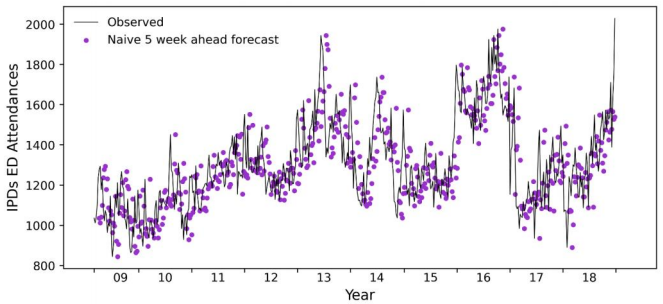

Figure S45: Visualization of IPDs ED attendance case counts versus 5-week ahead naïve forecasts (taking the latest available observation of URTI case counts at the contemporaneous time point as the 5-step ahead forecast)

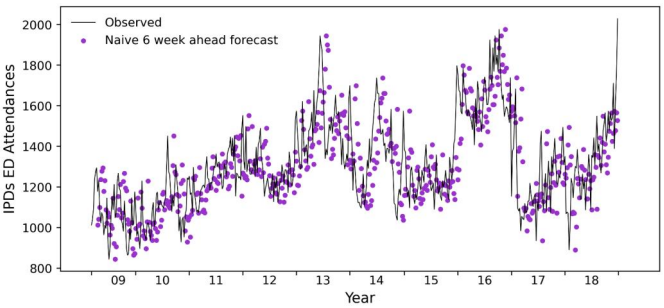

Figure S46: Visualization of IPDs ED attendance case counts versus 6-week ahead naïve forecasts (taking the latest available observation of URTI case counts at the contemporaneous time point as the 6-step ahead forecast)

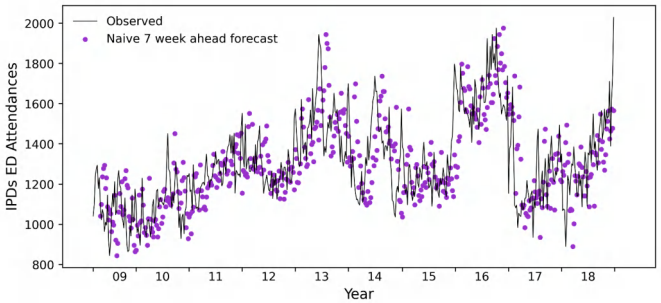

Figure S47: Visualization of IPDs ED attendance case counts versus 7-week ahead naïve forecasts (taking the latest available observation of URTI case counts at the contemporaneous time point as the 7-step ahead forecast)

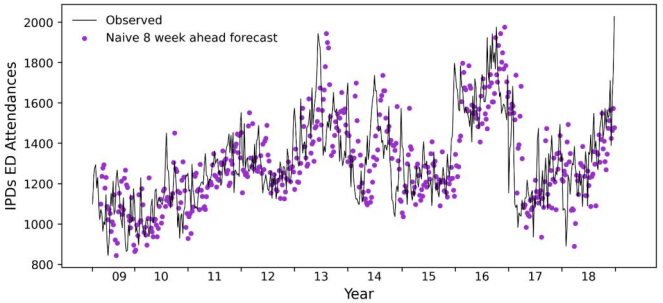

Figure S48: Visualization of IPDs ED attendance case counts versus 8-week ahead naïve forecasts (taking the latest available observation of URTI case counts at the contemporaneous time point as the 8-step ahead forecast)

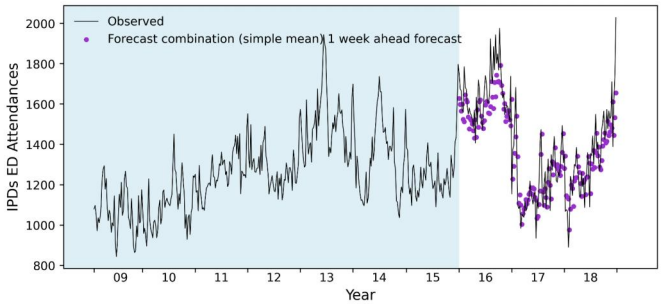

Figure S49: Visualization of IPDs ED attendance case counts versus 1-week ahead forecasts from forecast combinations based on simple averaging.

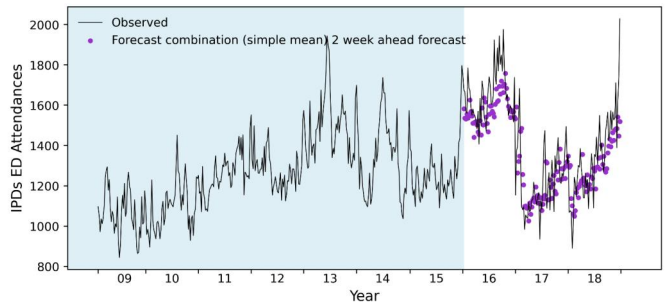

Figure S50: Visualization of IPDs ED attendance case counts versus 2-week ahead forecasts from forecast combinations based on simple averaging.

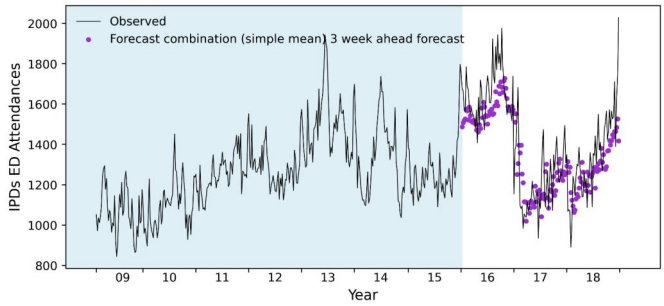

Figure S51: Visualization of IPDs ED attendance case counts versus 3-week ahead forecasts from forecast combinations based on simple averaging.

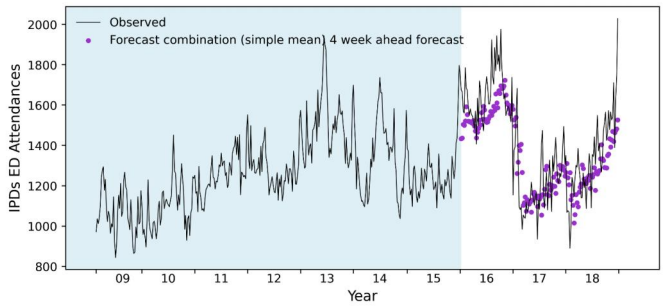

Figure S52: Visualization of IPDs ED attendance case counts versus 4-week ahead forecasts from forecast combinations based on simple averaging.

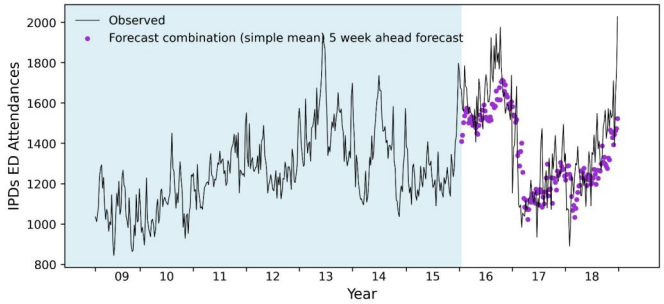

Figure S53: Visualization of IPDs ED attendance case counts versus 5-week ahead forecasts from forecast combinations based on simple averaging.

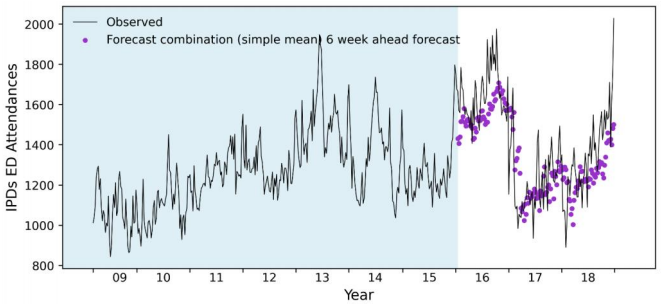

Figure S54: Visualization of IPDs ED attendance case counts versus 6-week ahead forecasts from forecast combinations based on simple averaging.

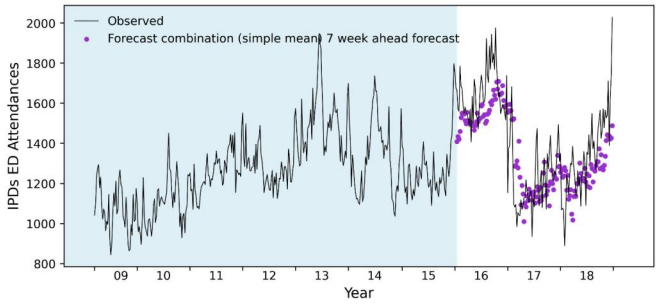

Figure S55: Visualization of IPDs ED attendance case counts versus 7-week ahead forecasts from forecast combinations based on simple averaging.

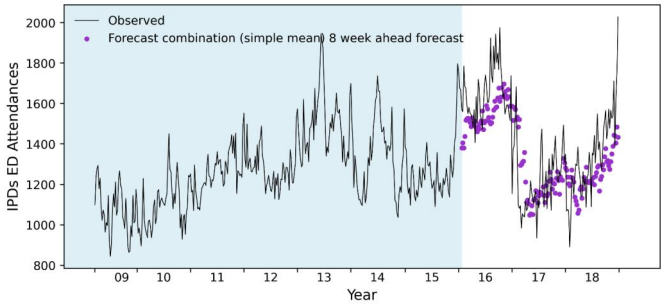

Figure S56: Visualization of IPDs ED attendance case counts versus 8-week ahead forecasts from forecast combinations based on simple averaging.

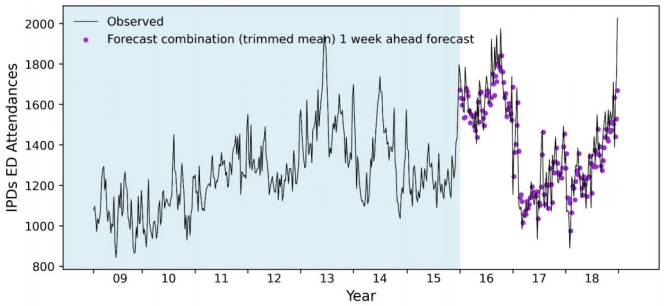

Figure S57: Visualization of IPDs ED attendance case counts versus 1-week ahead forecasts from forecast combinations based on trimmed mean.

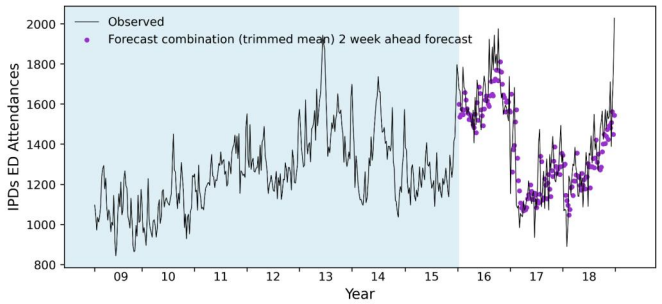

Figure S58: Visualization of IPDs ED attendance case counts versus 2-week ahead forecasts from forecast combinations based on trimmed mean.

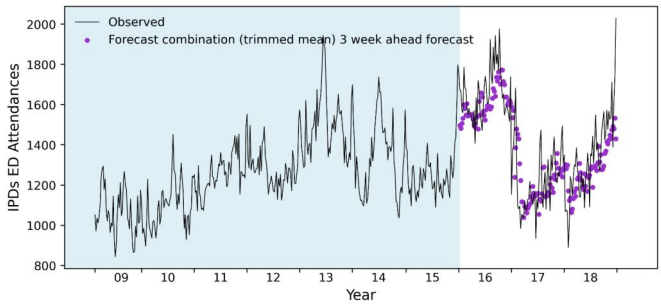

Figure S59: Visualization of IPDs ED attendance case counts versus 3-week ahead forecasts from forecast combinations based on trimmed mean.

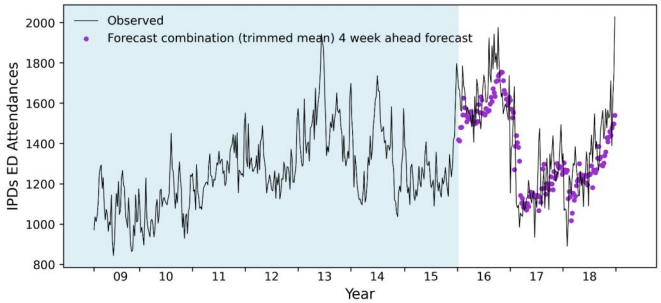

Figure S60: Visualization of IPDs ED attendance case counts versus 4-week ahead forecasts from forecast combinations based on trimmed mean.

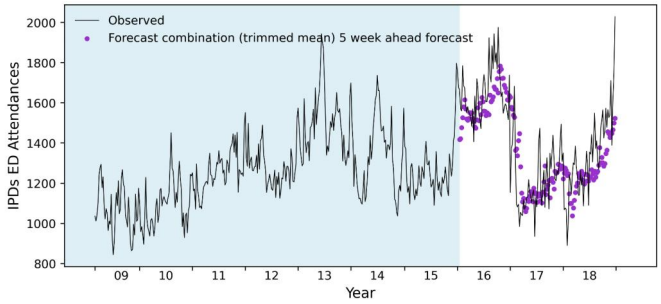

Figure S61: Visualization of IPDs ED attendance case counts versus 5-week ahead forecasts from forecast combinations based on trimmed mean.

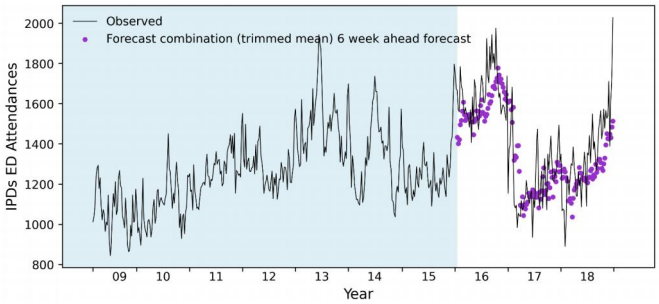

Figure S62: Visualization of IPDs ED attendance case counts versus 6-week ahead forecasts from forecast combinations based on trimmed mean.

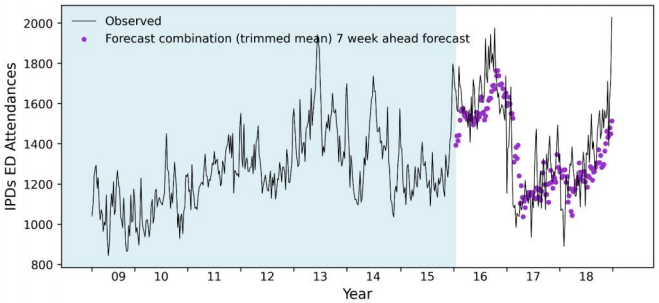

Figure S63 Visualization of IPDs ED attendance case counts versus 7-week ahead forecasts from forecast combinations based on trimmed mean.

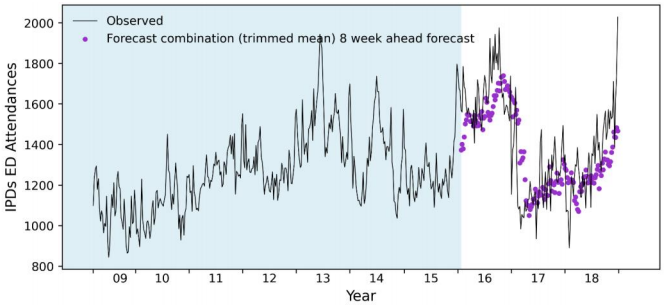

Figure S64: Visualization of IPDs ED attendance case counts versus 8-week ahead forecasts from forecast combinations based on trimmed mean.