Supplemental Materials

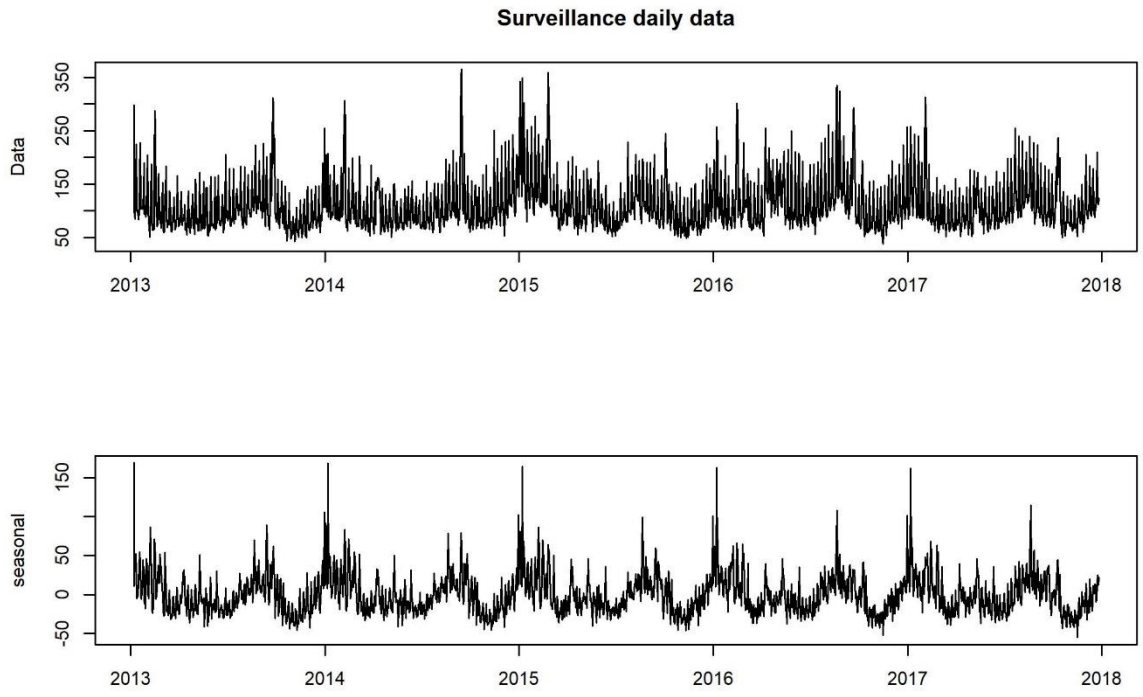

Figure S1. Daily Diarrhea syndromic surveillance data.

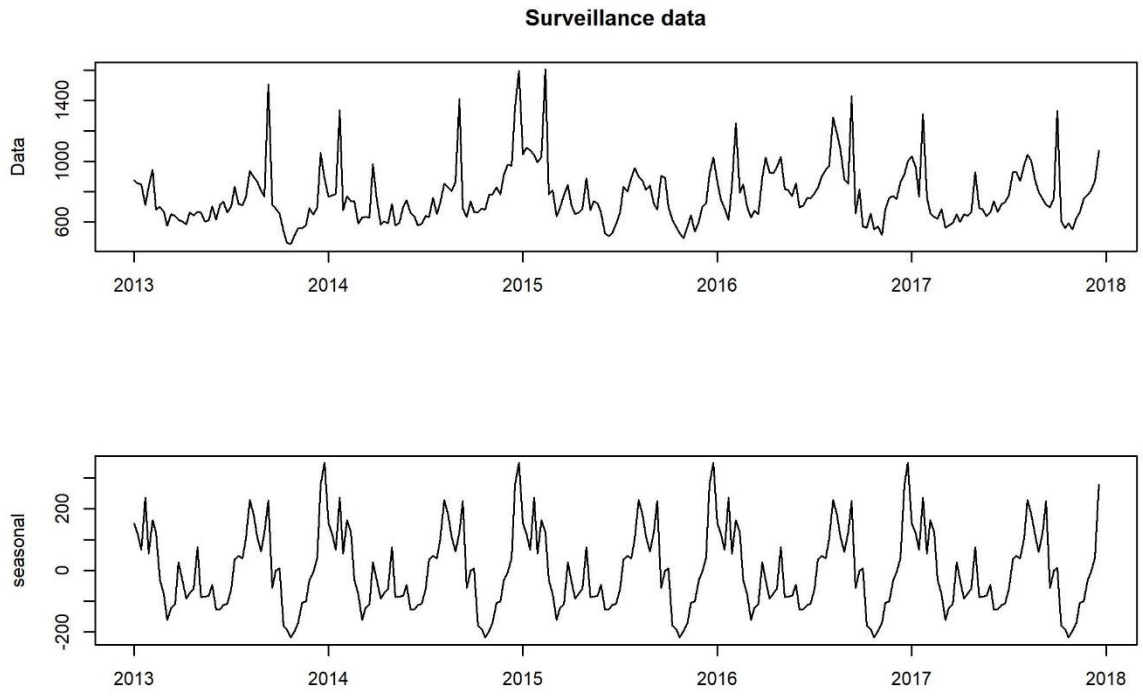

Figure S2. Weekly Diarrhea syndromic surveillance data.

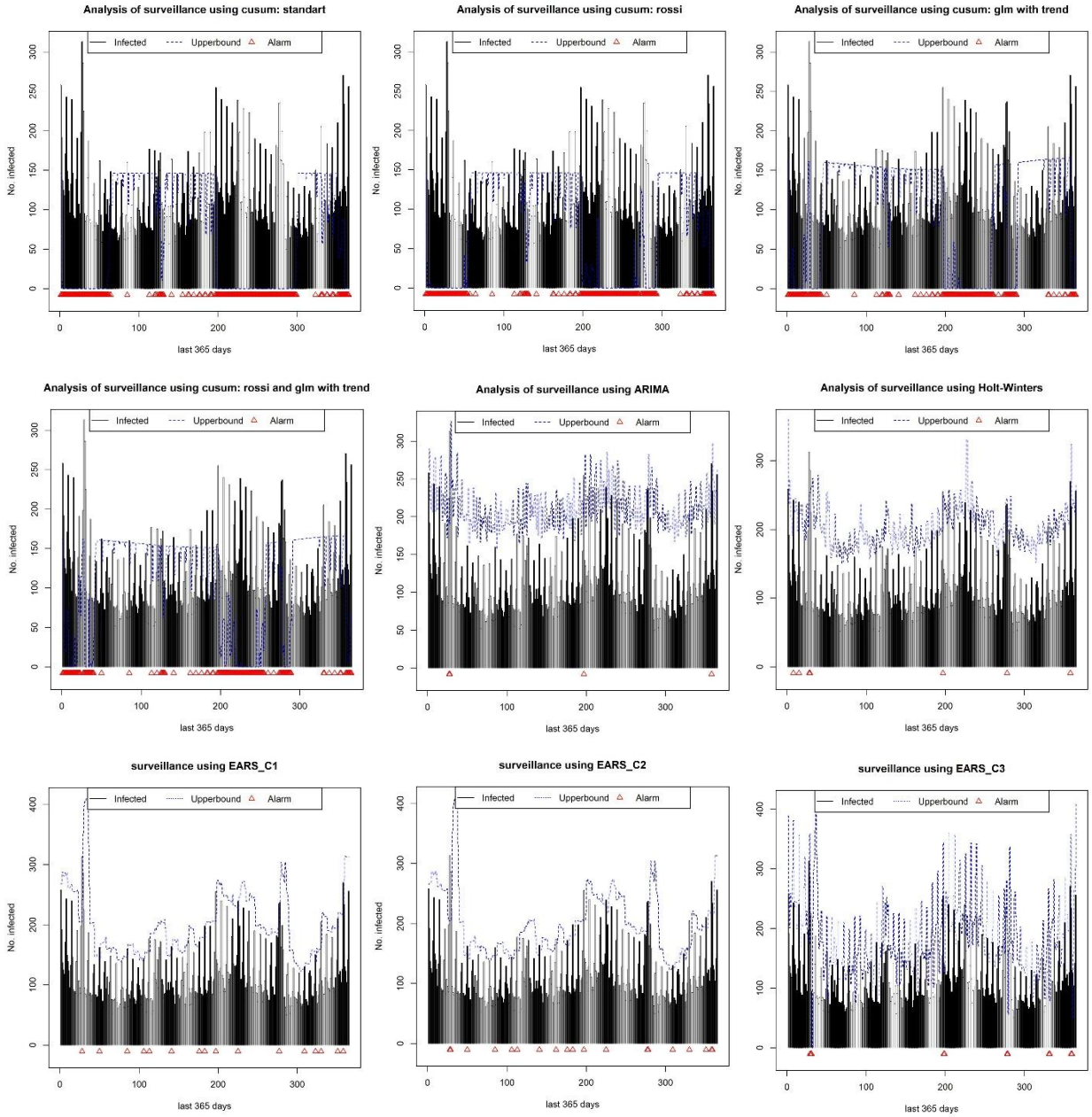

Figure S3. The results of the selected algorithms for daily real data.

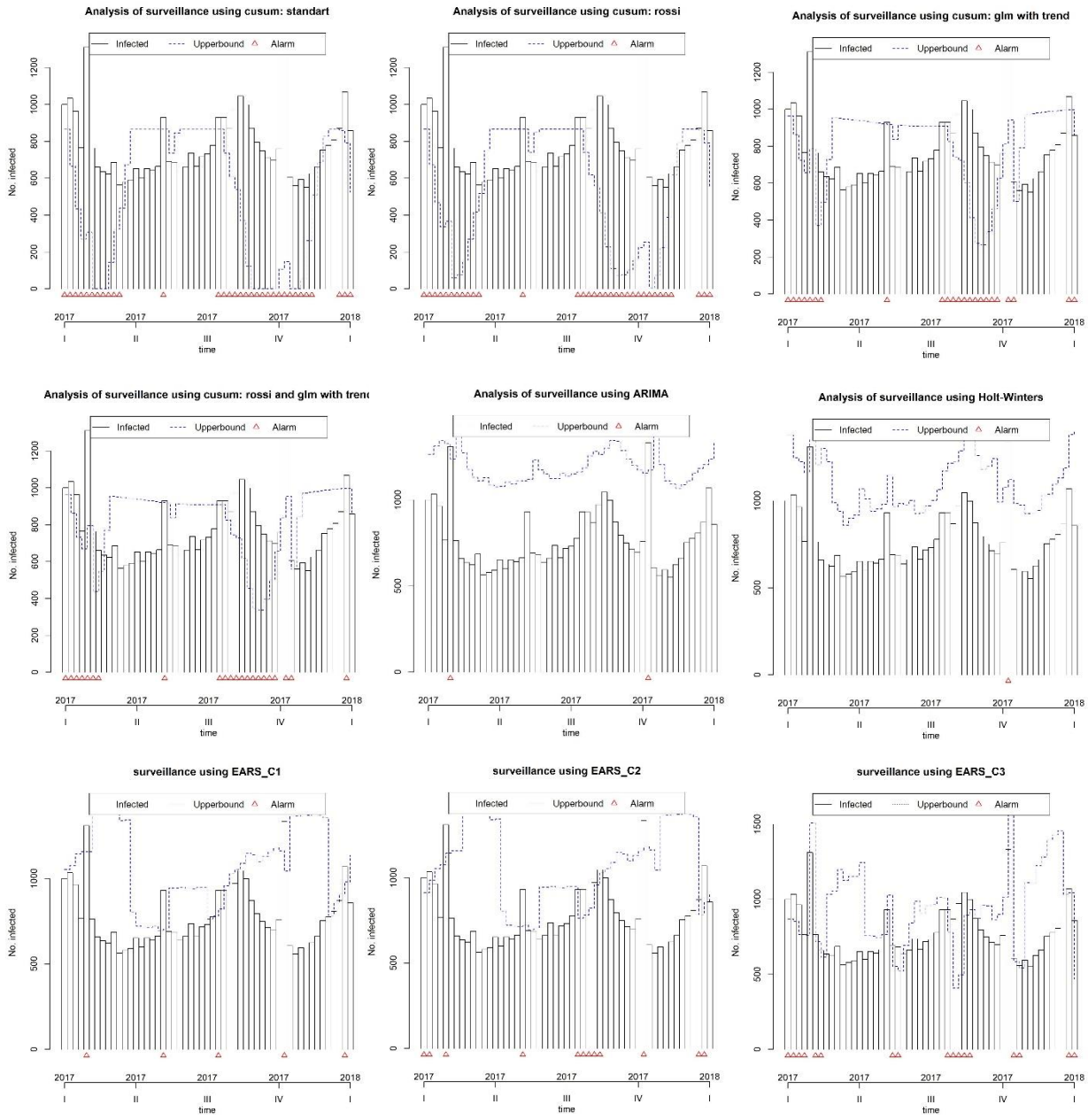

Figure S4. The results of the selected algorithms for weekly real data.

Table S1. 42 scenarios used to generate data.

Scenario	θ	β	γ_1	γ_2	ϕ	m	Trend
1	0.1	0	0	0	1.5	0	0
2	0.1	0	0.6	0.6	1.5	1	0
3	0.1	0	0.6	0.6	1.5	2	0
4	0.1	0.0025	0	0	1.5	0	1
5	0.1	0.0025	0.6	0.6	1.5	1	1
6	0.1	0.0025	0.6	0.6	1.5	2	1
7	-2	0	0	0	2	0	0
8	-2	0	0.1	0.3	2	1	0
9	-2	0	0.1	0.3	2	2	0
10	-2	0.005	0	0	2	0	1
11	-2	0.005	0.1	0.3	2	1	1
12	-2	0.005	0.1	0.3	2	2	1
13	1.5	0	0	0	1	0	0
14	1.5	0	0.2	-0.4	1	1	0
15	1.5	0	0.2	-0.4	1	2	0
16	1.5	0.003	0	0	1	0	1
17	1.5	0.003	0.2	-0.4	1	1	1
18	1.5	0.003	0.2	-0.4	1	2	1
19	0.5	0	0	0	5	0	0
20	0.5	0	0.5	0.5	5	1	0
21	0.5	0	0.5	0.5	5	2	0
22	0.5	0.002	0	0	5	0	1
23	0.5	0.002	0.5	0.5	5	1	1
24	0.5	0.002	0.5	0.5	5	2	1
25	2.5	0	0	0	3	0	0
26	2.5	0	1	0.1	3	1	0
27	2.5	0	1	0.1	3	2	0
28	2.5	0.001	0	0	3	0	1
29	2.5	0.001	1	0.1	3	1	1
30	2.5	0.001	1	0.1	3	2	1
31	3.75	0	0	0	1.1	0	0
32	3.75	0	0.1	-0.1	1.1	1	0
33	3.75	0	0.1	-0.1	1.1	2	0
34	3.75	0.001	0	0	1.1	0	1
35	3.75	0.001	0.1	-0.1	1.1	1	1
36	3.75	0.001	0.1	-0.1	1.1	2	1
37	5	0	0	0	1.2	0	0
38	5	0	0.05	0.01	1.2	1	0
39	5	0	0.05	0.01	1.2	2	0
40	5	0.0001	0	0	1.2	0	1
41	5	0.0001	0.05	0.01	1.2	1	1
42	5	0.0001	0.05	0.01	1.2	2	1

Table S2. The average result of the best CUSUM (glm with trend) algorithm.

Scenario	Sensitivity	Specificity	PPV	NPV	F measure	sMAPE	RMSE	MAD
1	0.53	0.95	0.46	0.98	0.39	98.02	4.56	4.26
2	0.77	0.91	0.43	0.99	0.48	106.82	5.26	4.66
3	0.85	0.83	0.35	0.99	0.44	120.31	6.97	5.66
4	0.28	0.97	0.37	0.97	0.23	79.30	8.62	8.05
5	0.56	0.95	0.54	0.98	0.42	84.47	9.38	8.46
6	0.79	0.74	0.22	0.98	0.32	106.82	11.67	9.66
7	0.29	0.95	0.22	0.98	0.18	64.79	1.85	1.74
8	0.35	0.95	0.23	0.98	0.21	66.32	1.90	1.79
9	0.42	0.95	0.29	0.98	0.25	68.97	1.94	1.83
10	0.08	0.95	0.06	0.97	0.04	90.00	6.60	6.12
11	0.08	0.95	0.05	0.97	0.04	89.58	6.54	6.04
12	0.13	0.93	0.07	0.97	0.06	91.88	6.63	6.10
13	0.87	0.87	0.43	0.99	0.51	103.66	10.19	9.00
14	0.86	0.87	0.41	0.99	0.50	104.63	10.79	9.27
15	0.85	0.82	0.33	0.99	0.42	108.42	11.53	9.63
16	0.64	0.91	0.41	0.97	0.43	54.26	20.54	18.62
17	0.73	0.92	0.50	0.98	0.52	55.25	21.34	19.13
18	0.74	0.67	0.15	0.97	0.24	80.00	27.15	23.65
19	0.91	0.81	0.30	0.99	0.42	131.14	7.88	6.48
20	0.93	0.79	0.32	1.00	0.45	138.22	10.59	8.00
21	0.98	0.74	0.34	1.00	0.47	150.92	17.41	11.02
22	0.90	0.80	0.30	0.99	0.43	108.35	11.60	9.96
23	0.90	0.81	0.33	0.99	0.45	116.31	14.45	11.82
24	0.91	0.75	0.31	0.99	0.42	125.01	18.96	14.18
25	0.94	0.77	0.37	0.99	0.49	108.41	26.24	19.29
26	0.98	0.72	0.42	1.00	0.54	132.05	60.20	33.28
27	0.97	0.67	0.40	0.99	0.51	151.50	145.46	68.48
28	0.90	0.78	0.36	0.99	0.46	93.51	30.57	24.38
29	0.96	0.75	0.44	0.99	0.55	114.79	62.00	39.29
30	0.97	0.66	0.36	0.99	0.49	142.07	154.67	80.75
31	0.89	0.81	0.47	0.99	0.53	77.67	41.42	34.31
32	0.91	0.75	0.42	0.99	0.50	84.93	44.59	35.81
33	0.92	0.76	0.43	0.99	0.51	85.05	45.91	36.89
34	0.95	0.83	0.50	1.00	0.60	60.07	51.95	44.52
35	0.89	0.84	0.50	0.99	0.57	60.96	54.48	45.88
36	0.89	0.82	0.47	0.99	0.54	63.04	57.28	47.49
37	0.99	0.73	0.43	1.00	0.56	79.78	139.16	101.61
38	0.97	0.68	0.40	1.00	0.51	86.32	140.84	105.76
39	0.96	0.72	0.46	0.99	0.57	84.81	151.83	108.91
40	0.97	0.65	0.38	0.99	0.50	89.09	145.94	110.80
41	0.98	0.69	0.42	1.00	0.54	85.40	145.32	109.63
42	0.97	0.73	0.43	1.00	0.55	78.91	144.36	106.23

Table S3. The average result of the EARS C3 algorithm.

Scenario	Sensitivity	Specificity	PPV	NPV	F measure	sMAPE	RMSE	MAD
1	0.4	0.94	0.29	0.97	0.33	67.78	2.79	2.36
2	0.56	0.93	0.35	0.97	0.42	77.25	4.04	3.08
3	0.64	0.89	0.32	0.97	0.41	88.08	6.84	4.49
4	0.22	0.93	0.13	0.96	0.16	56.16	5.14	4.67
5	0.5	0.9	0.24	0.97	0.31	65.24	6.42	5.5
6	0.52	0.83	0.2	0.96	0.28	83.6	10.66	8.38
7	0.15	0.99	0.45	0.98	0.14	NA	NA	NA
8	0.07	0.99	0.32	0.97	0.08	NA	NA	NA
9	0.11	1	0.34	0.98	0.11	NA	NA	NA
10	0.08	0.92	0.03	0.97	0.04	69.81	4.15	3.68
11	0.11	0.91	0.04	0.97	0.06	69.89	4.15	3.68
12	0.15	0.9	0.05	0.97	0.07	72.52	4.23	3.74
13	0.63	0.92	0.41	0.97	0.48	77.09	9.81	7.35
14	0.67	0.91	0.4	0.98	0.48	77.97	10.43	7.48
15	0.67	0.89	0.33	0.97	0.43	82.75	11.9	8.41
16	0.45	0.94	0.37	0.96	0.37	40.44	16.13	14.16
17	0.53	0.9	0.3	0.96	0.37	44.59	17.45	15.1
18	0.48	0.81	0.17	0.95	0.25	54.87	22.06	18.2
19	0.62	0.93	0.42	0.97	0.48	109.97	9.14	6.41
20	0.69	0.93	0.47	0.98	0.54	110.7	12.41	8.01
21	0.74	0.92	0.51	0.98	0.57	113.87	23.44	12.61
22	0.57	0.91	0.33	0.97	0.41	97.05	12.44	10.2
23	0.62	0.9	0.38	0.97	0.45	101.98	16.85	12.49
24	0.71	0.88	0.36	0.97	0.46	108.34	22.53	15.45
25	0.72	0.93	0.56	0.97	0.61	76.12	33.74	21.04
26	0.75	0.87	0.43	0.97	0.53	89.11	88.21	43.43
27	0.74	0.81	0.35	0.96	0.47	111.8	229.95	106.17
28	0.65	0.95	0.59	0.97	0.59	62.88	36.1	24.6
29	0.73	0.86	0.41	0.97	0.51	79.53	86.88	46.81
30	0.72	0.81	0.35	0.95	0.46	108.27	238.19	120.81
31	0.68	0.95	0.63	0.97	0.63	40.75	43.13	26.54
32	0.71	0.94	0.62	0.97	0.64	42.34	49.4	29.01
33	0.73	0.92	0.51	0.97	0.59	45.22	52.54	31.07
34	0.68	0.96	0.71	0.97	0.67	32.61	48.96	31.94
35	0.66	0.93	0.52	0.96	0.56	33.05	50.83	32.71
36	0.73	0.89	0.44	0.97	0.54	35.01	53.79	34.14
37	0.7	0.96	0.76	0.96	0.7	37.59	166.41	87.25
38	0.69	0.96	0.71	0.96	0.68	37.26	169.08	89.31
39	0.69	0.95	0.69	0.96	0.67	39.36	189.27	98.86
40	0.71	0.97	0.76	0.96	0.72	37.94	174.48	93.15
41	0.7	0.96	0.75	0.96	0.7	37.49	173.52	91.82
42	0.71	0.95	0.68	0.96	0.67	37.4	176.42	93.62

Table S4. The result of the ARIMA algorithm.

Scenario	Sensitivity	Specificity	PPV	NPV	F Measure	sMAPE	RMSE	MAD
1	0.39	0.98	0.54	0.97	0.40	86.38	3.96	3.75
2	0.42	0.99	0.69	0.96	0.48	99.28	5.23	4.98
3	0.34	0.99	0.82	0.96	0.44	117.29	7.89	7.51
4	0.31	0.96	0.29	0.97	0.27	60.86	5.91	5.37
5	0.33	0.97	0.43	0.96	0.35	75.01	8.05	7.37
6	0.27	0.97	0.47	0.95	0.31	91.27	11.56	10.65
7	0.30	0.97	0.28	0.98	0.25	42.44	1.50	1.45
8	0.34	0.97	0.27	0.98	0.26	43.23	1.52	1.47
9	0.37	0.97	0.32	0.98	0.30	44.56	1.54	1.50
10	0.23	0.92	0.08	0.97	0.11	66.86	4.08	3.70
11	0.17	0.91	0.05	0.97	0.08	67.90	4.15	3.76
12	0.19	0.91	0.08	0.97	0.10	69.53	4.28	3.88
13	0.41	1.00	0.90	0.96	0.52	99.62	11.95	11.38
14	0.36	1.00	0.89	0.95	0.47	104.77	13.38	12.71
15	0.35	0.99	0.84	0.95	0.46	106.86	14.38	13.66
16	0.38	0.97	0.51	0.95	0.40	43.04	16.99	15.38
17	0.29	0.97	0.44	0.95	0.33	50.04	20.31	18.33
18	0.22	0.96	0.34	0.94	0.25	55.58	23.32	20.99
19	0.39	0.99	0.70	0.96	0.47	133.71	11.22	10.76
20	0.35	0.99	0.83	0.95	0.46	142.84	15.48	14.83
21	0.31	1.00	0.98	0.94	0.44	156.49	25.49	24.03
22	0.42	0.97	0.53	0.96	0.44	105.12	14.20	13.29
23	0.33	0.98	0.64	0.94	0.41	115.86	18.57	17.51
24	0.27	0.99	0.73	0.94	0.37	128.78	26.66	25.26
25	0.32	1.00	1.00	0.94	0.47	111.61	37.84	36.01
26	0.19	1.00	1.00	0.92	0.31	141.95	87.49	82.37
27	0.15	1.00	1.00	0.90	0.25	164.49	221.65	209.94
28	0.33	1.00	0.98	0.94	0.47	85.66	38.00	35.97
29	0.18	1.00	1.00	0.92	0.30	123.30	92.52	87.14
30	0.16	1.00	1.00	0.90	0.27	152.84	238.75	225.32
31	0.28	1.00	1.00	0.93	0.41	64.61	46.71	44.25
32	0.25	1.00	1.00	0.93	0.38	68.10	51.05	48.06
33	0.21	1.00	1.00	0.92	0.34	69.79	52.87	49.84
34	0.32	1.00	1.00	0.93	0.47	42.48	46.92	44.34
35	0.26	1.00	0.98	0.93	0.39	45.53	51.17	48.05
36	0.20	1.00	0.99	0.93	0.32	47.77	54.15	50.95
37	0.19	1.00	1.00	0.91	0.31	64.57	164.12	153.96
38	0.18	1.00	1.00	0.91	0.30	65.41	165.35	155.85
39	0.16	1.00	1.00	0.90	0.27	68.21	178.83	167.54
40	0.17	1.00	1.00	0.90	0.28	64.63	176.77	164.52
41	0.17	1.00	1.00	0.91	0.28	66.33	180.95	169.81
42	0.17	1.00	1.00	0.91	0.28	67.41	185.55	174.12

Table S5. The result of Holt-Winter algorithm.

Scenario	Sensitivity	Specificity	PPV	NPV	F Measure	sMAPE	RMSE	MAD
1	0.35	0.99	0.55	0.97	0.37	75.09	3.29	3.10
2	0.47	0.99	0.79	0.97	0.54	87.72	4.28	4.05
3	0.46	1.00	0.91	0.96	0.57	109.35	6.84	6.48
4	0.26	0.96	0.29	0.96	0.24	53.13	4.97	4.50
5	0.39	0.97	0.45	0.96	0.39	62.57	5.95	5.45
6	0.44	0.98	0.62	0.96	0.49	78.41	8.36	7.80
7	0.27	0.97	0.31	0.98	0.23	25.02	1.24	1.19
8	0.32	0.97	0.27	0.98	0.25	26.20	1.26	1.21
9	0.35	0.97	0.32	0.98	0.28	27.00	1.28	1.23
10	0.20	0.93	0.08	0.97	0.11	57.99	3.44	3.09
11	0.14	0.92	0.05	0.97	0.07	57.78	3.40	3.06
12	0.21	0.92	0.09	0.97	0.11	59.02	3.47	3.13
13	0.44	1.00	0.95	0.96	0.56	92.22	10.31	9.79
14	0.43	1.00	0.92	0.96	0.55	97.15	11.41	10.83
15	0.41	1.00	0.94	0.96	0.53	99.44	12.28	11.66
16	0.35	0.97	0.53	0.95	0.39	37.79	14.54	13.14
17	0.35	0.97	0.51	0.95	0.38	41.20	15.42	13.96
18	0.33	0.96	0.41	0.95	0.35	44.75	16.51	15.02
19	0.43	0.99	0.76	0.96	0.51	127.28	9.67	9.22
20	0.40	1.00	0.91	0.95	0.53	138.25	13.88	13.18
21	0.34	1.00	0.96	0.94	0.47	153.77	23.85	22.27
22	0.43	0.97	0.59	0.96	0.47	97.60	12.05	11.19
23	0.39	0.99	0.72	0.95	0.48	110.19	16.18	15.23
24	0.34	1.00	0.89	0.94	0.46	124.94	24.21	22.79
25	0.37	1.00	0.99	0.94	0.51	105.84	34.23	32.26
26	0.19	0.99	0.81	0.92	0.30	132.57	85.94	79.14
27	0.16	0.99	0.83	0.90	0.25	160.36	221.76	205.68
28	0.34	1.00	0.98	0.94	0.48	81.40	35.31	33.31
29	0.18	0.99	0.84	0.92	0.29	114.75	85.67	79.39
30	0.17	0.99	0.86	0.90	0.28	149.00	222.73	206.48
31	0.31	1.00	0.98	0.94	0.43	60.08	43.06	40.33
32	0.28	1.00	0.97	0.93	0.41	63.73	47.21	44.18
33	0.26	1.00	0.95	0.93	0.39	65.45	49.69	46.18
34	0.36	1.00	0.98	0.94	0.50	40.18	44.59	41.89
35	0.31	1.00	1.00	0.93	0.45	42.50	47.73	44.77
36	0.31	1.00	0.99	0.94	0.45	44.32	50.28	47.14
37	0.19	0.99	0.87	0.91	0.30	60.63	154.03	142.45
38	0.18	0.99	0.85	0.91	0.29	61.86	157.11	145.97
39	0.17	0.99	0.85	0.90	0.28	64.76	171.70	158.03
40	0.18	1.00	0.89	0.90	0.29	58.10	153.06	141.91
41	0.18	0.99	0.85	0.91	0.29	59.73	158.83	147.32
42	0.17	1.00	0.86	0.91	0.27	61.31	164.40	152.66