

G : SMAPE of Models

Method	Train	Test	All
Neural Network	13.13	39.64	17.95
ETS	22.63	35.12	24.71
SARIMA	18.83	33.32	21.25
Hybrid*	15.93	32.20	18.88
Bayesian Structural	34.59	64.98	39.65
Prophet	37.18	42.65	38.09

H : RMSE of Models

Method	Train	Test	All
Neural Network	23176.16	73219.50	37606.10
ETS	40787.00	63654.19	45405.13
SARIMA	41584.99	53909.93	43880.21
Hybrid*	33238.48	51273.44	37174.16
Bayesian Structural	55537.49	98552.75	64723.40
Prophet	54483.47	62728.71	55942.14

I : MASE of Models

Method	Train	Test	All
Neural Network	0.29	1.11	0.43
ETS	0.47	1.07	0.56
SARIMA	0.44	0.71	0.49
Hybrid*	0.38	0.93	0.47
Bayesian Structural	0.67	1.80	0.85
Prophet	0.65	1.07	0.83

J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.96	0.64	0.90
ETS	0.88	0.81	0.86
SARIMA	0.88	0.81	0.87
Hybrid*	0.92	0.90	0.90
Bayesian Structural	0.78	0.81	0.71
Prophet	0.78	0.79	0.77

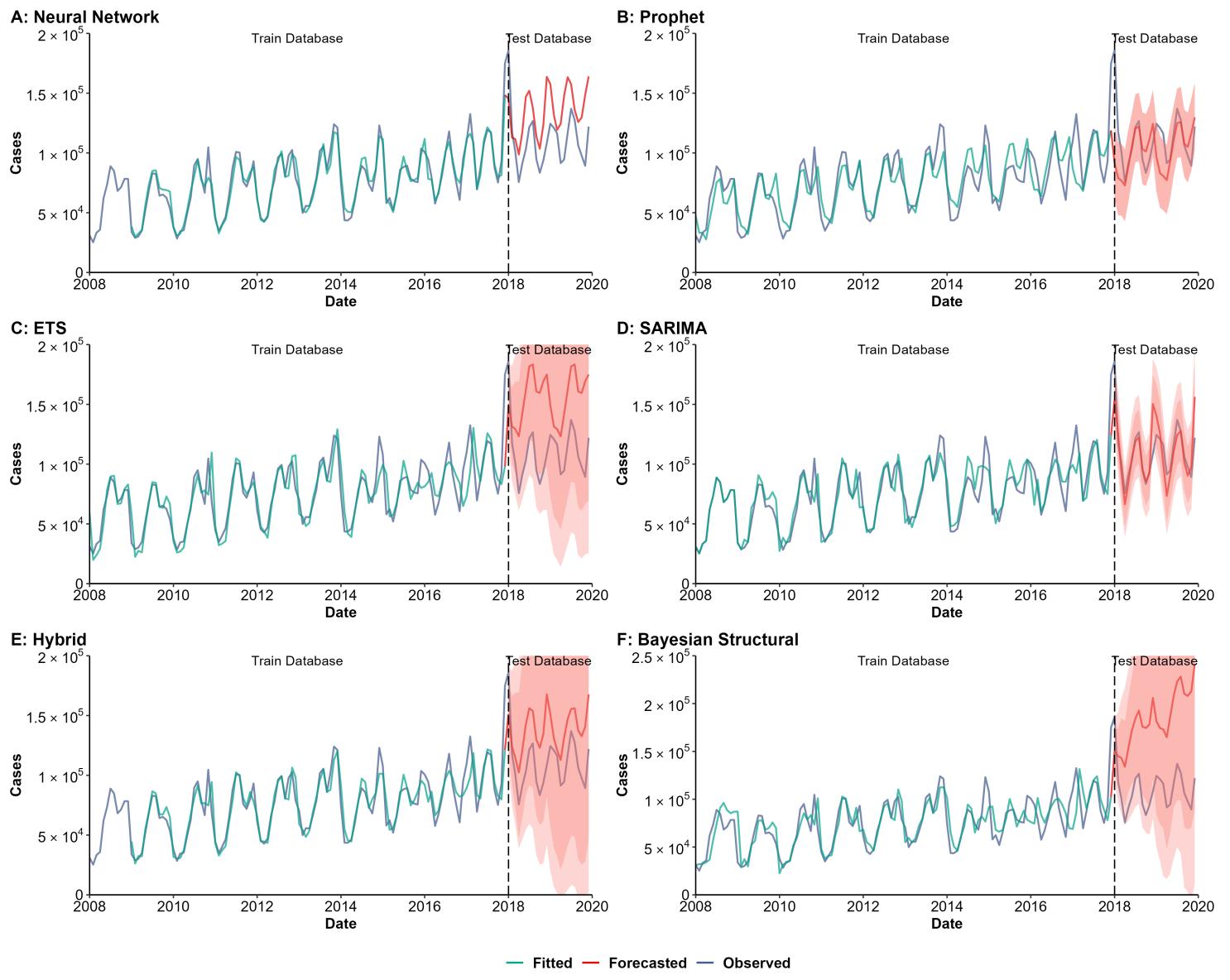
*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 25. Training and comparing variant time series models for hand, foot, and mouth disease (HFMD).

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	6.56	22.95	9.54
ETS	13.26	36.59	17.15
SARIMA	10.37	9.05	10.15
Hybrid*	9.45	24.74	12.23
Bayesian Structural	15.32	52.15	21.46
Prophet	15.19	15.84	15.30

H : RMSE of Models

Method	Train	Test	All
Neural Network	6977.20	32417.57	15195.48
ETS	14680.66	52087.28	25135.28
SARIMA	12083.49	15076.35	12631.64
Hybrid*	10859.52	33000.47	17160.80
Bayesian Structural	16986.54	80925.42	36495.74
Prophet	15066.43	26355.63	17462.36

I : MASE of Models

Method	Train	Test	All
Neural Network	0.39	1.74	0.69
ETS	0.66	4.02	1.17
SARIMA	0.59	0.50	0.56
Hybrid*	0.49	2.07	0.88
Bayesian Structural	0.80	6.24	1.79
Prophet	0.76	1.55	1.06

J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.93	0.24	0.79
ETS	0.69	0.06	0.61
SARIMA	0.79	0.63	0.81
Hybrid*	0.83	0.35	0.74
Bayesian Structural	0.59	0.02	0.47
Prophet	0.67	0.05	0.63

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

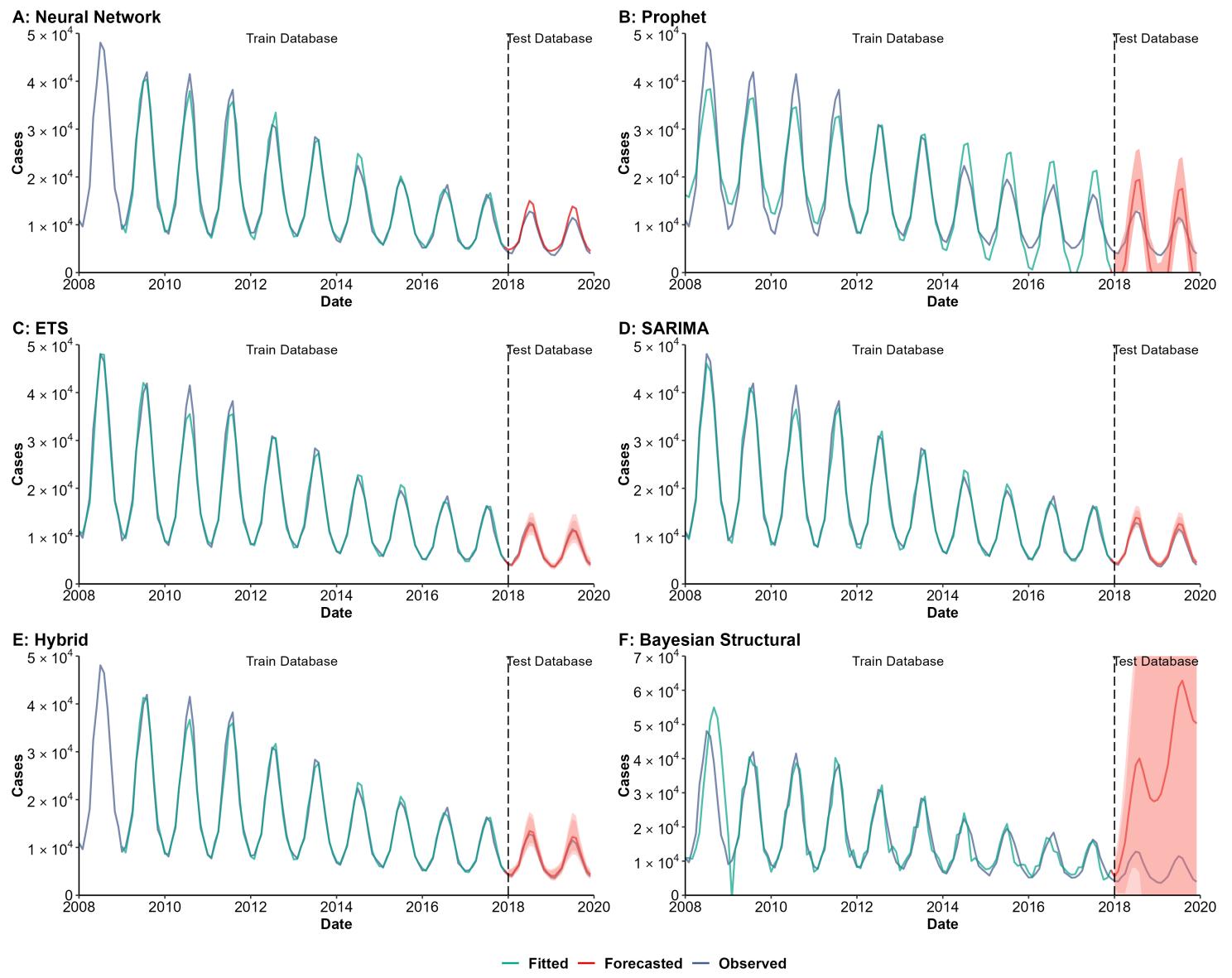
*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 26. Training and comparing variant time series models for infectious diarrhea.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	5.96	12.08	7.07
ETS	4.49	4.42	4.48
SARIMA	4.92	8.70	5.55
Hybrid*	4.52	6.32	4.85
Bayesian Structural	17.83	123.02	35.36
Prophet	25.40	107.97	39.16

H : RMSE of Models

Method	Train	Test	All
Neural Network	1341.68	1162.83	1310.97
ETS	1256.34	418.50	1159.53
SARIMA	1202.99	776.71	1143.03
Hybrid*	1128.40	518.20	1044.32
Bayesian Structural	4875.02	32607.31	14036.06
Prophet	3405.23	5416.59	3814.83

I : MASE of Models

Method	Train	Test	All
Neural Network	0.26	0.55	0.29
ETS	0.20	0.24	0.21
SARIMA	0.22	0.43	0.23
Hybrid*	0.20	0.30	0.22
Bayesian Structural	0.71	6.98	1.66
Prophet	0.68	1.26	0.79

J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.98	0.98	0.98
ETS	0.99	0.98	0.99
SARIMA	0.99	0.99	0.99
Hybrid*	0.99	0.99	0.99
Bayesian Structural	0.81	0.20	0.21
Prophet	0.89	0.97	0.87

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

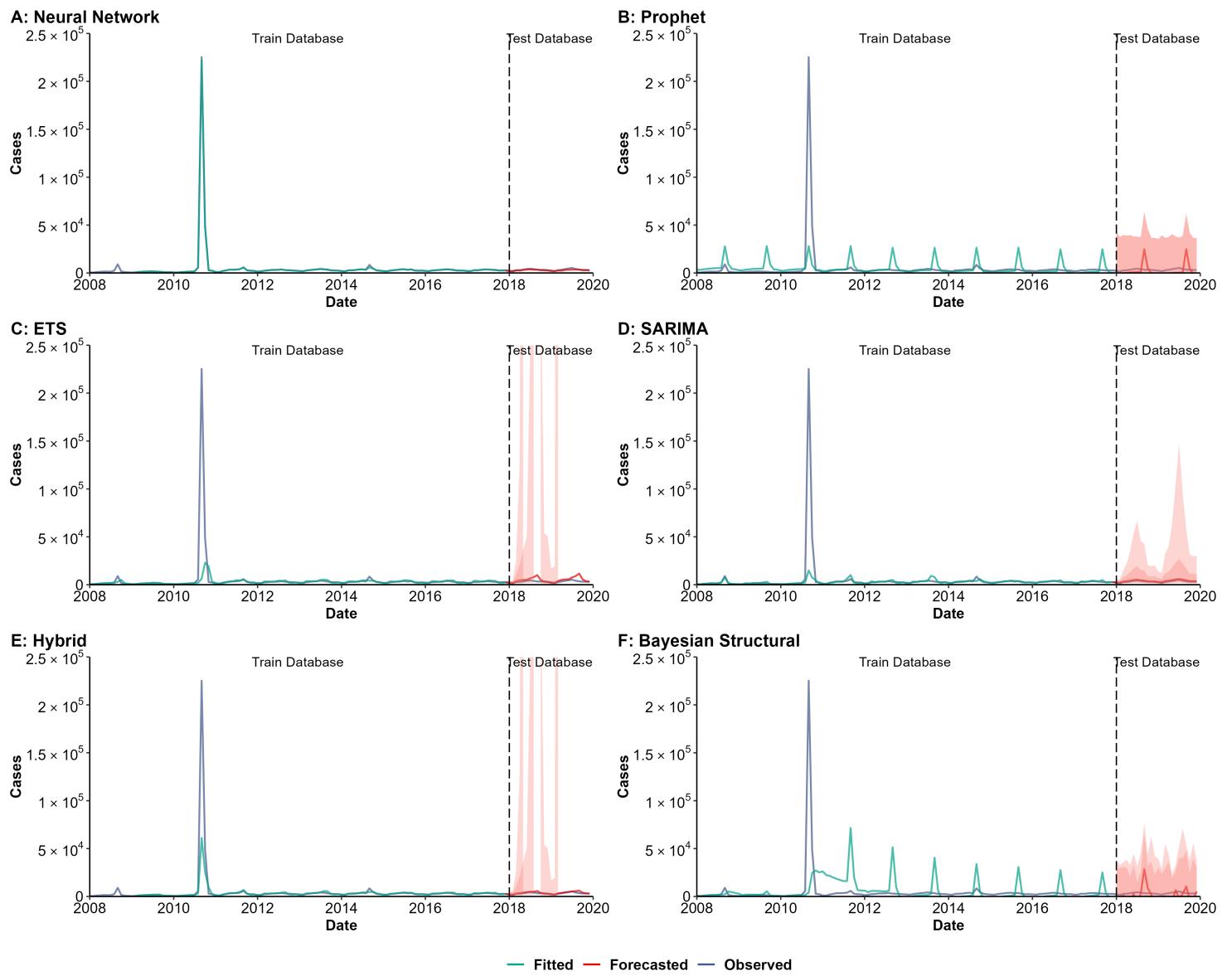
*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 27. Training and comparing variant time series models for dysentery.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

H : RMSE of Models

I : MASE of Models

J : R_Squared of Models

Method	Train	Test	All	Method	Train	Test	All	Method	Train	Test	All	Method	Train	Test	All
Neural Network	2.34	15.58	4.77	Neural Network	446.55	656.28	491.71	Neural Network	0.03	1.83	0.05	Neural Network	1.00	0.70	1.00
ETS	24.01	35.46	25.92	ETS	20195.98	2775.09	18471.10	ETS	0.64	1.23	2.54	ETS	0.07	0.42	0.06
SARIMA	20.55	18.78	20.25	SARIMA	19596.54	750.26	17891.73	SARIMA	2.39	1.38	2.31	SARIMA	0.37	0.91	0.34
Hybrid*	14.26	15.04	14.40	Hybrid*	16043.64	880.38	14504.60	Hybrid*	0.46	0.91	1.29	Hybrid*	0.94	0.65	0.93
Bayesian Structural	119.92	145.03	124.11	Bayesian Structural	23230.53	7742.52	21440.75	Bayesian Structural	1.82	0.81	1.37	Bayesian Structural	0.00	0.02	0.00
Prophet	81.26	165.30	95.27	Prophet	19473.99	6946.19	18002.00	Prophet	1.22	1.05	1.21	Prophet	0.11	0.01	0.10

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

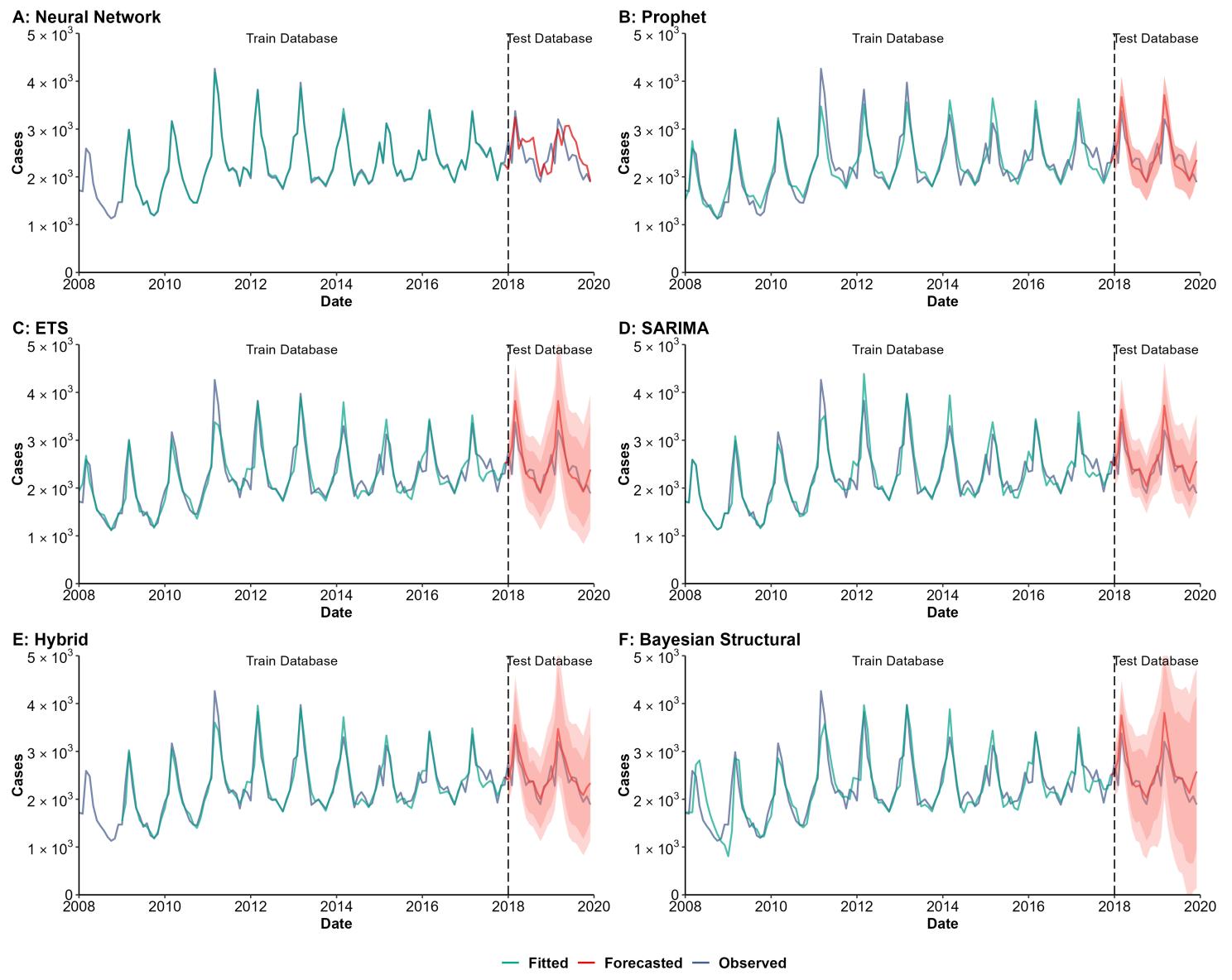
*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 28. Training and comparing variant time series models for acute hemorrhagic conjunctivitis (AHC).

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	0.98	12.86	3.14
ETS	6.99	8.03	7.17
SARIMA	6.43	8.26	6.73
Hybrid*	5.11	7.24	5.50
Bayesian Structural	10.03	8.68	9.81
Prophet	7.33	7.98	7.44

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	30.97	367.42	159.16
ETS	222.77	288.91	235.09
SARIMA	230.76	273.79	238.47
Hybrid*	168.34	227.57	180.56
Bayesian Structural	308.89	301.30	307.64
Prophet	220.79	257.90	227.39

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.07	1.20	0.24
ETS	0.48	0.65	0.55
SARIMA	0.47	0.71	0.51
Hybrid*	0.36	0.71	0.44
Bayesian Structural	0.66	0.75	0.70
Prophet	0.51	0.67	0.58

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

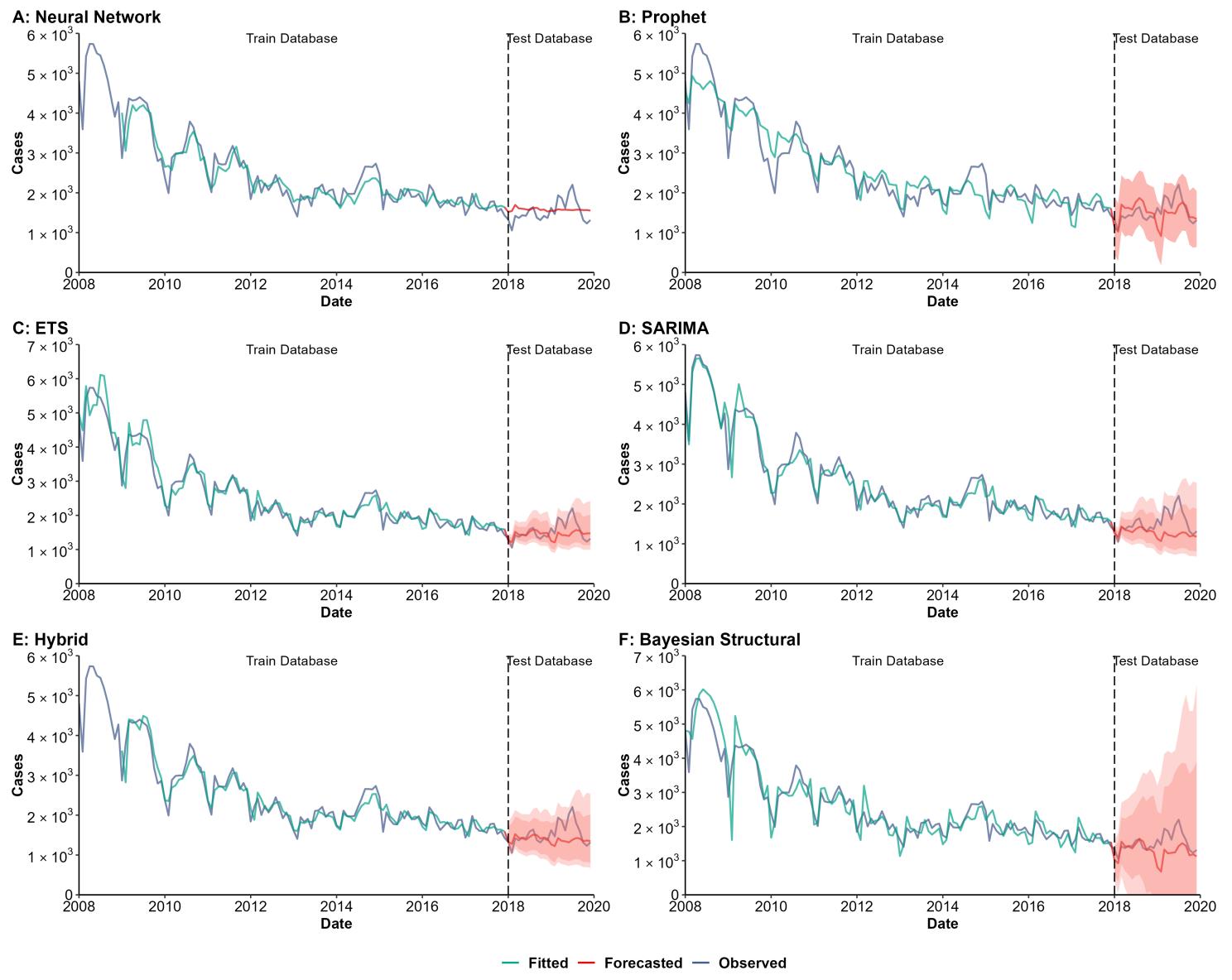
J : R_Squared of Models

Method	Train	Test	All
Neural Network	1.00	0.34	0.92
ETS	0.86	0.74	0.84
SARIMA	0.86	0.74	0.85
Hybrid*	0.91	0.76	0.89
Bayesian Structural	0.76	0.72	0.75
Prophet	0.86	0.75	0.84

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 29. Training and comparing variant time series models for hepatitis E.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	8.37	14.48	9.49
ETS	7.19	13.24	8.20
SARIMA	6.80	18.58	8.76
Hybrid*	6.53	13.95	7.88
Bayesian Structural	10.83	20.47	12.44
Prophet	10.68	15.54	11.49

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	263.00	271.43	264.55
ETS	279.29	273.89	278.40
SARIMA	252.42	388.68	279.78
Hybrid*	210.43	309.21	231.55
Bayesian Structural	408.83	398.95	407.20
Prophet	359.57	290.52	349.01

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	1.29	8.66	1.56
ETS	0.74	2.68	0.93
SARIMA	0.73	3.81	0.91
Hybrid*	0.66	3.46	1.05
Bayesian Structural	1.05	1.78	0.88
Prophet	1.01	1.49	1.47

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

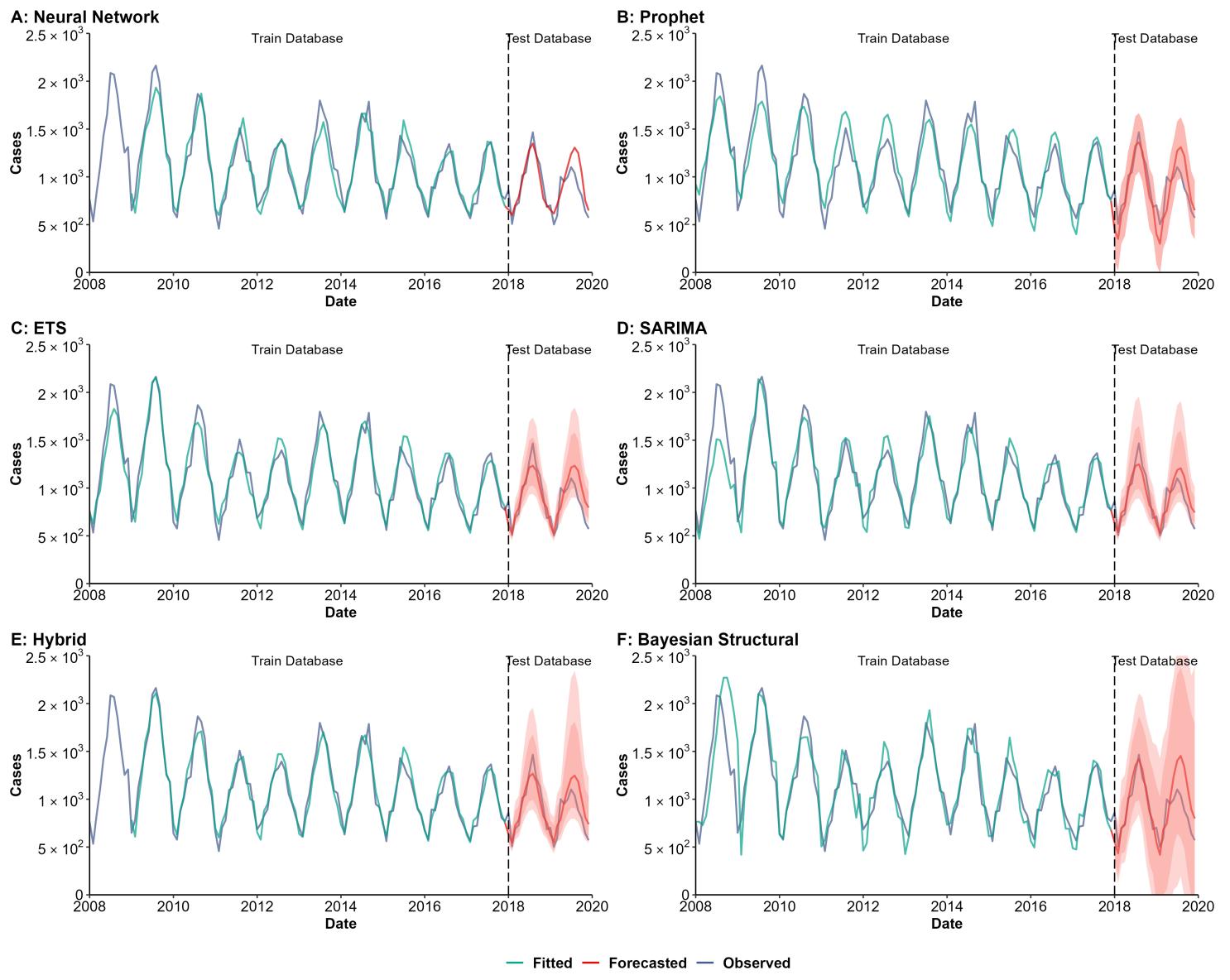
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.87	0.00	0.88
ETS	0.94	0.08	0.94
SARIMA	0.94	0.00	0.94
Hybrid*	0.92	0.00	0.91
Bayesian Structural	0.88	0.06	0.89
Prophet	0.89	0.13	0.89

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 30. Training and comparing variant time series models for hepatitis A.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	8.46	12.76	9.25
ETS	8.23	13.58	9.12
SARIMA	9.45	12.75	10.00
Hybrid*	6.82	13.26	7.99
Bayesian Structural	12.74	17.62	13.56
Prophet	12.06	18.98	13.21

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	118.03	141.95	122.73
ETS	114.57	145.92	120.36
SARIMA	149.06	131.32	146.25
Hybrid*	90.79	138.74	101.21
Bayesian Structural	205.33	203.74	205.07
Prophet	157.13	180.50	161.26

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.57	0.89	0.62
ETS	0.48	1.03	0.59
SARIMA	0.61	0.96	0.65
Hybrid*	0.41	0.98	0.51
Bayesian Structural	0.74	0.96	0.72
Prophet	0.70	0.85	0.77

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

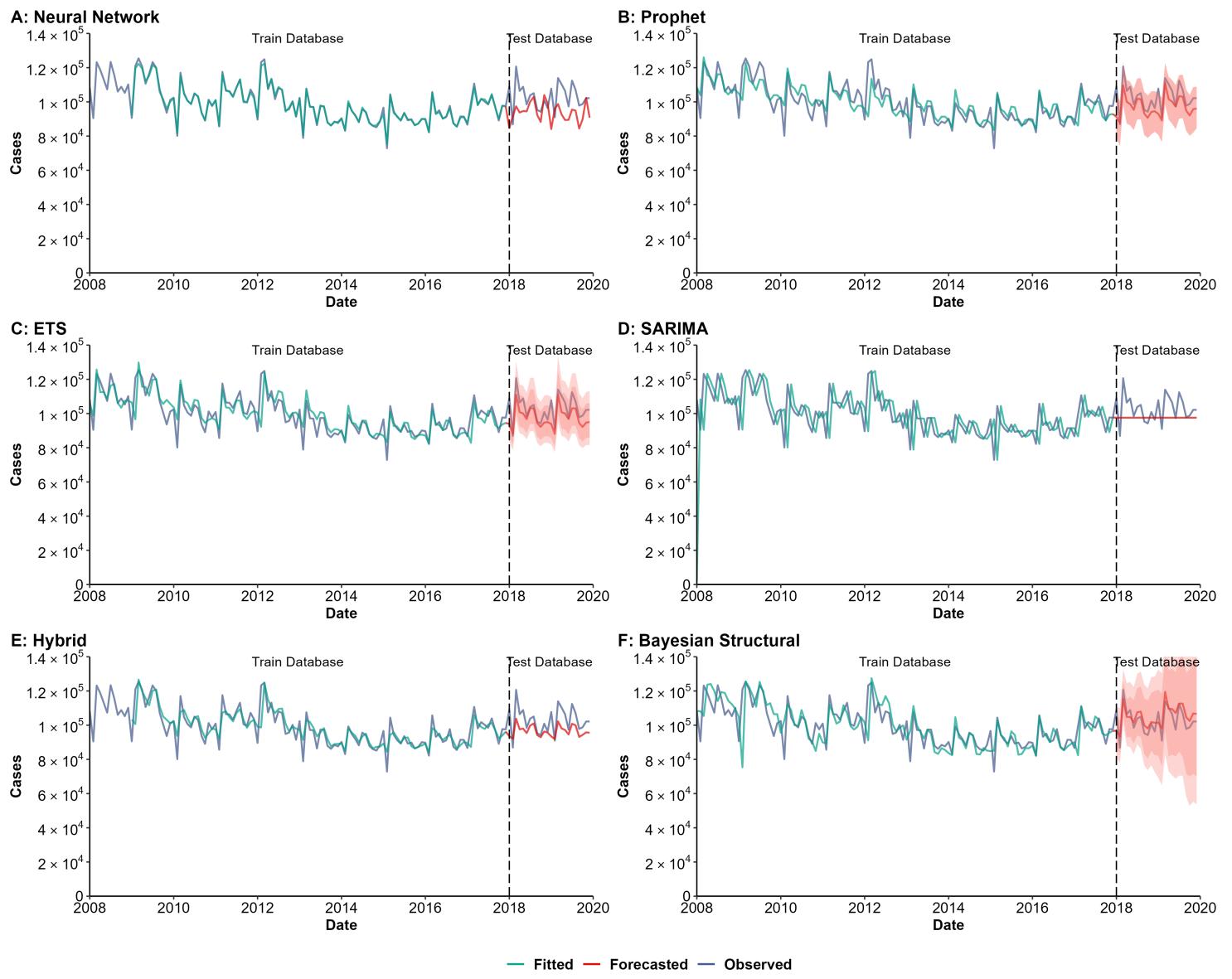
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.90	0.72	0.88
ETS	0.91	0.68	0.90
SARIMA	0.86	0.73	0.85
Hybrid*	0.94	0.71	0.92
Bayesian Structural	0.78	0.65	0.77
Prophet	0.83	0.71	0.82

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 31. Training and comparing variant time series models for enteric fever.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	0.71	10.66	2.52
ETS	4.23	5.29	4.41
SARIMA	9.86	7.33	9.44
Hybrid*	3.73	6.84	4.29
Bayesian Structural	5.35	4.52	5.22
Prophet	4.51	5.67	4.71

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	1043.61	12781.76	5531.31
ETS	6186.51	6740.76	6282.28
SARIMA	15019.08	9396.49	14237.03
Hybrid*	5457.39	8429.23	6106.27
Bayesian Structural	8381.15	5365.91	7958.34
Prophet	6379.45	7203.73	6524.06

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.10	1.65	0.35
ETS	0.51	0.98	0.78
SARIMA	0.99	Inf	1.16
Hybrid*	0.46	2.04	1.04
Bayesian Structural	0.65	0.91	0.83
Prophet	0.54	1.07	0.87

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

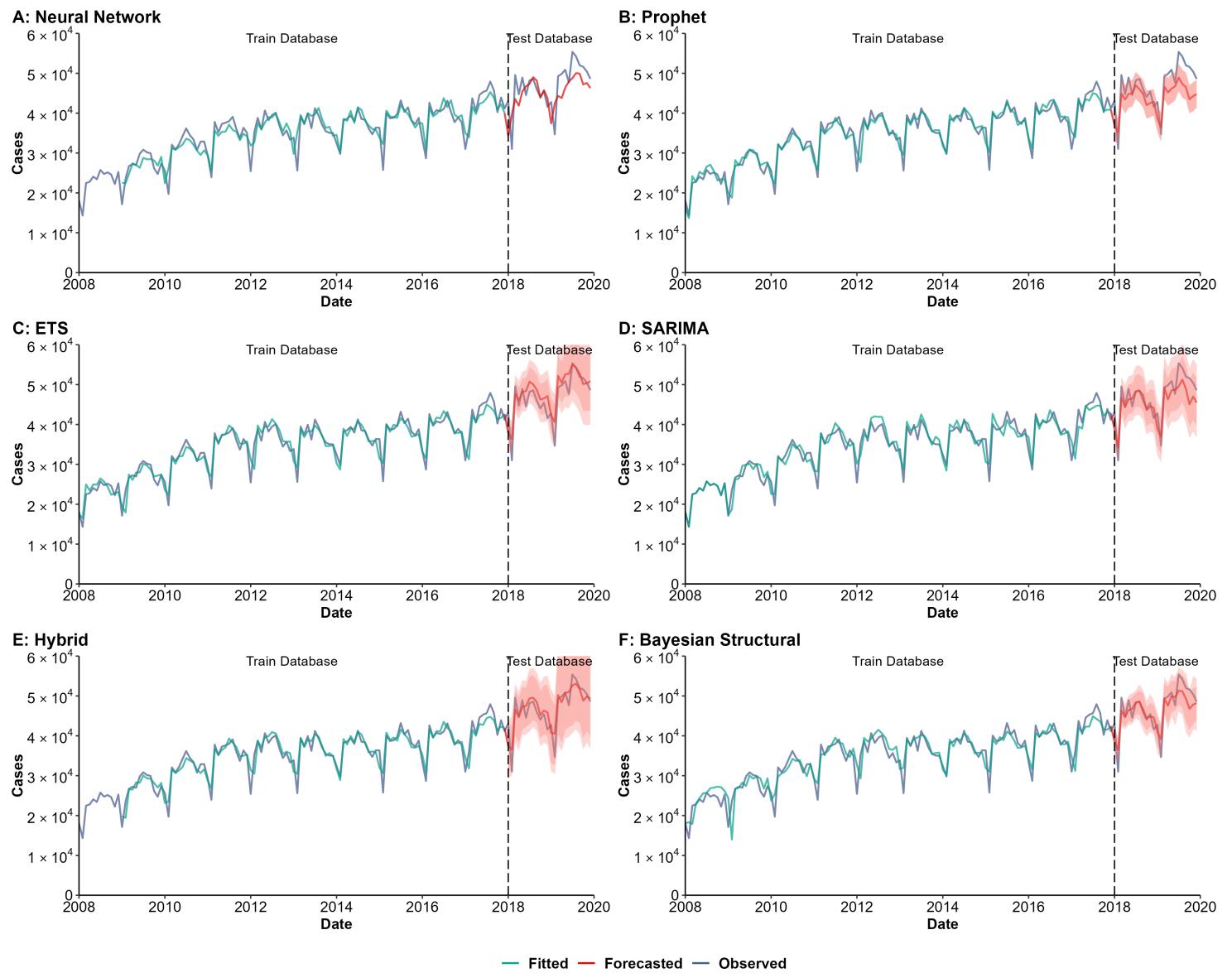
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.99	0.02	0.75
ETS	0.70	0.71	0.67
SARIMA	0.10	0.10	0.09
Hybrid*	0.74	0.64	0.66
Bayesian Structural	0.54	0.58	0.55
Prophet	0.67	0.67	0.64

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 32. Training and comparing variant time series models for hepatitis B.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	5.11	8.49	5.73
ETS	4.45	5.24	4.58
SARIMA	4.30	5.40	4.48
Hybrid*	4.18	4.93	4.32
Bayesian Structural	5.85	4.86	5.68
Prophet	4.02	8.01	4.68

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	2278.75	4532.96	2825.69
ETS	1865.54	2948.84	2085.54
SARIMA	1943.45	2973.29	2149.63
Hybrid*	1822.13	2744.08	2021.28
Bayesian Structural	2469.89	2717.47	2512.84
Prophet	1738.58	4219.98	2342.42

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.79	1.66	0.94
ETS	0.45	0.97	0.70
SARIMA	0.57	0.84	0.62
Hybrid*	0.44	0.97	0.69
Bayesian Structural	0.58	0.99	0.87
Prophet	0.41	1.65	0.74

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

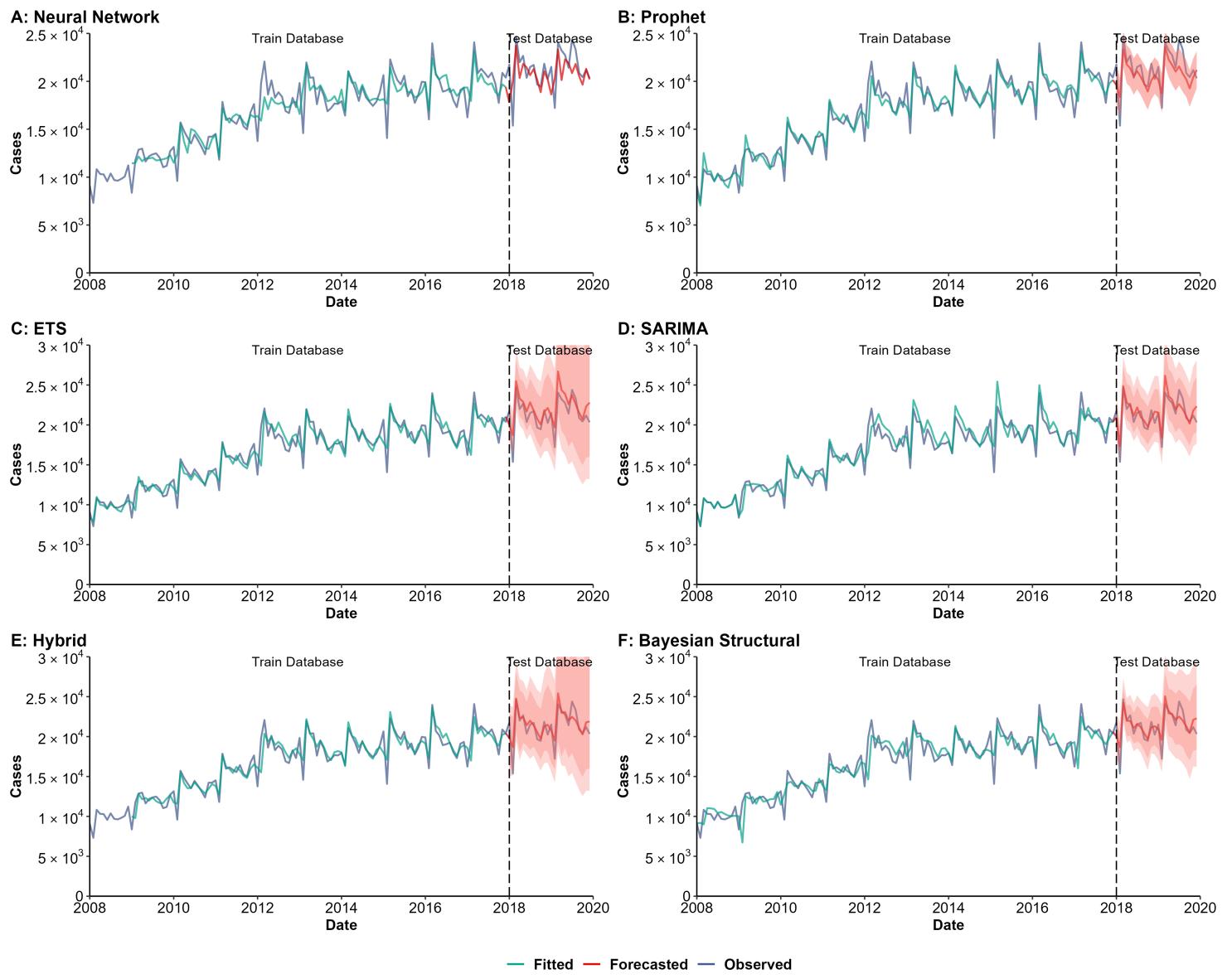
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.85	0.41	0.85
ETS	0.93	0.78	0.94
SARIMA	0.92	0.78	0.93
Hybrid*	0.90	0.76	0.92
Bayesian Structural	0.87	0.80	0.90
Prophet	0.93	0.76	0.93

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 33. Training and comparing variant time series models for syphilis.

(A) Neural Network model; (B) Prophet model; (C) Exponential smoothing (ETS) model; (D) Seasonal autoregressive integrated moving average (SARIMA) model; (E) Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; (F) Bayesian structural model; (G) Root mean square error (RMSE) of variant models; (H) Symmetric mean absolute percentage error (SMAPE) of variant models; (I) Mean absolute scaled error (MASE) of variant models; (J) R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	5.75	6.84	5.94
ETS	4.87	5.68	5.00
SARIMA	4.61	4.11	4.53
Hybrid*	4.39	4.46	4.40
Bayesian Structural	6.26	4.42	5.96
Prophet	4.50	5.45	4.66

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	1310.33	1927.81	1442.39
ETS	1061.91	1460.06	1137.98
SARIMA	1076.37	1059.44	1073.57
Hybrid*	1019.92	1213.19	1057.69
Bayesian Structural	1336.63	1208.47	1316.14
Prophet	1004.82	1386.00	1077.76

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.99	0.87	0.95
ETS	0.48	0.73	0.66
SARIMA	0.61	0.49	0.59
Hybrid*	0.43	0.67	0.66
Bayesian Structural	0.59	0.73	0.94
Prophet	0.44	0.94	0.66

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

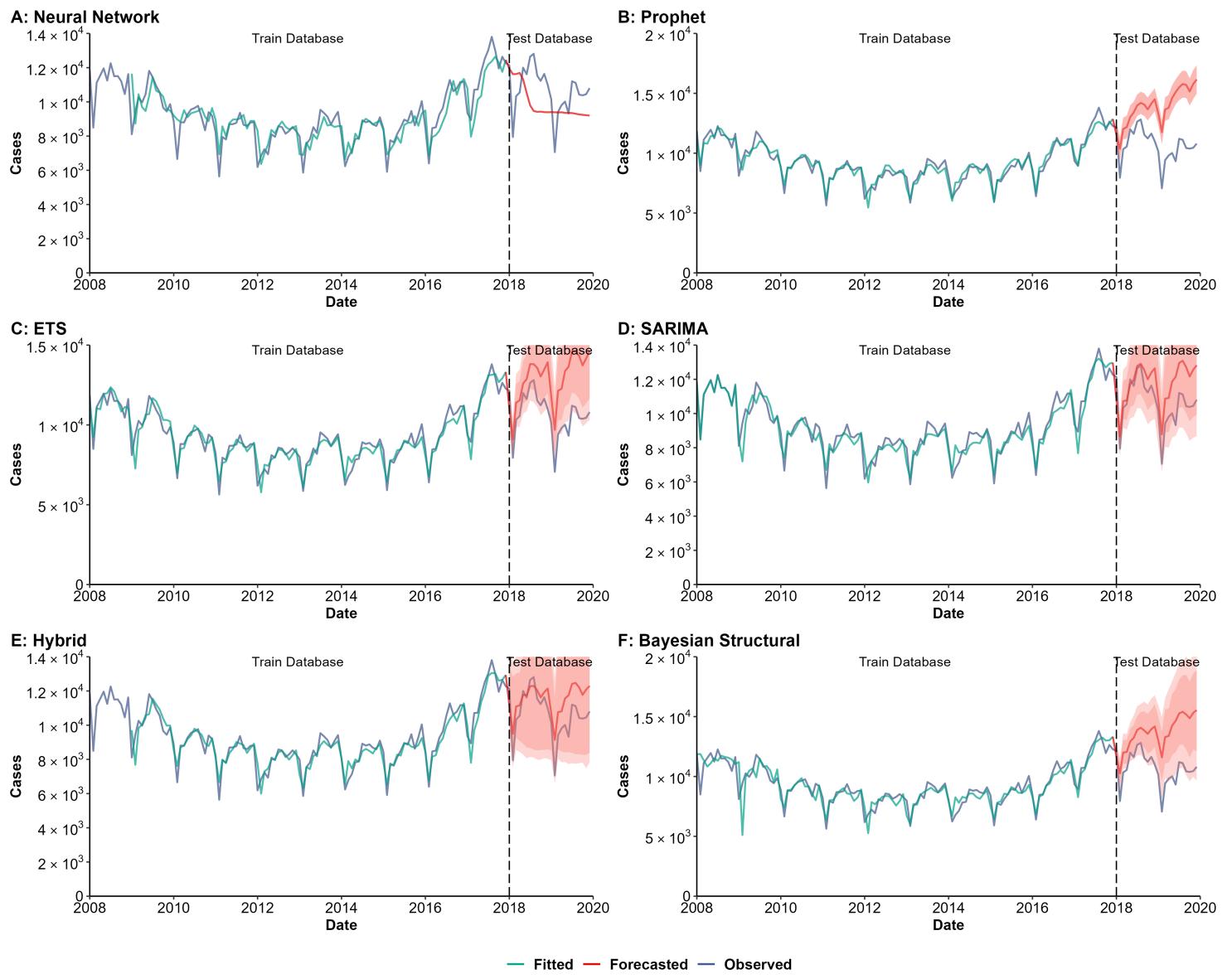
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.83	0.24	0.82
ETS	0.92	0.69	0.92
SARIMA	0.93	0.77	0.94
Hybrid*	0.90	0.69	0.91
Bayesian Structural	0.88	0.70	0.89
Prophet	0.93	0.69	0.93

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 34. Training and comparing variant time series models for hepatitis C.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	6.21	14.27	7.68
ETS	4.46	19.83	7.02
SARIMA	4.51	11.09	5.60
Hybrid*	4.31	9.91	5.33
Bayesian Structural	5.78	25.16	9.01
Prophet	4.06	26.95	7.88

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	767.86	1741.84	1016.88
ETS	523.49	2581.97	1157.35
SARIMA	531.86	1435.90	761.16
Hybrid*	517.55	1217.51	699.05
Bayesian Structural	803.90	3352.88	1553.12
Prophet	472.69	3643.86	1548.92

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.91	11.35	1.38
ETS	0.52	2.77	1.07
SARIMA	0.58	1.58	0.76
Hybrid*	0.53	1.82	0.85
Bayesian Structural	0.67	4.99	1.37
Prophet	0.47	5.11	1.37

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

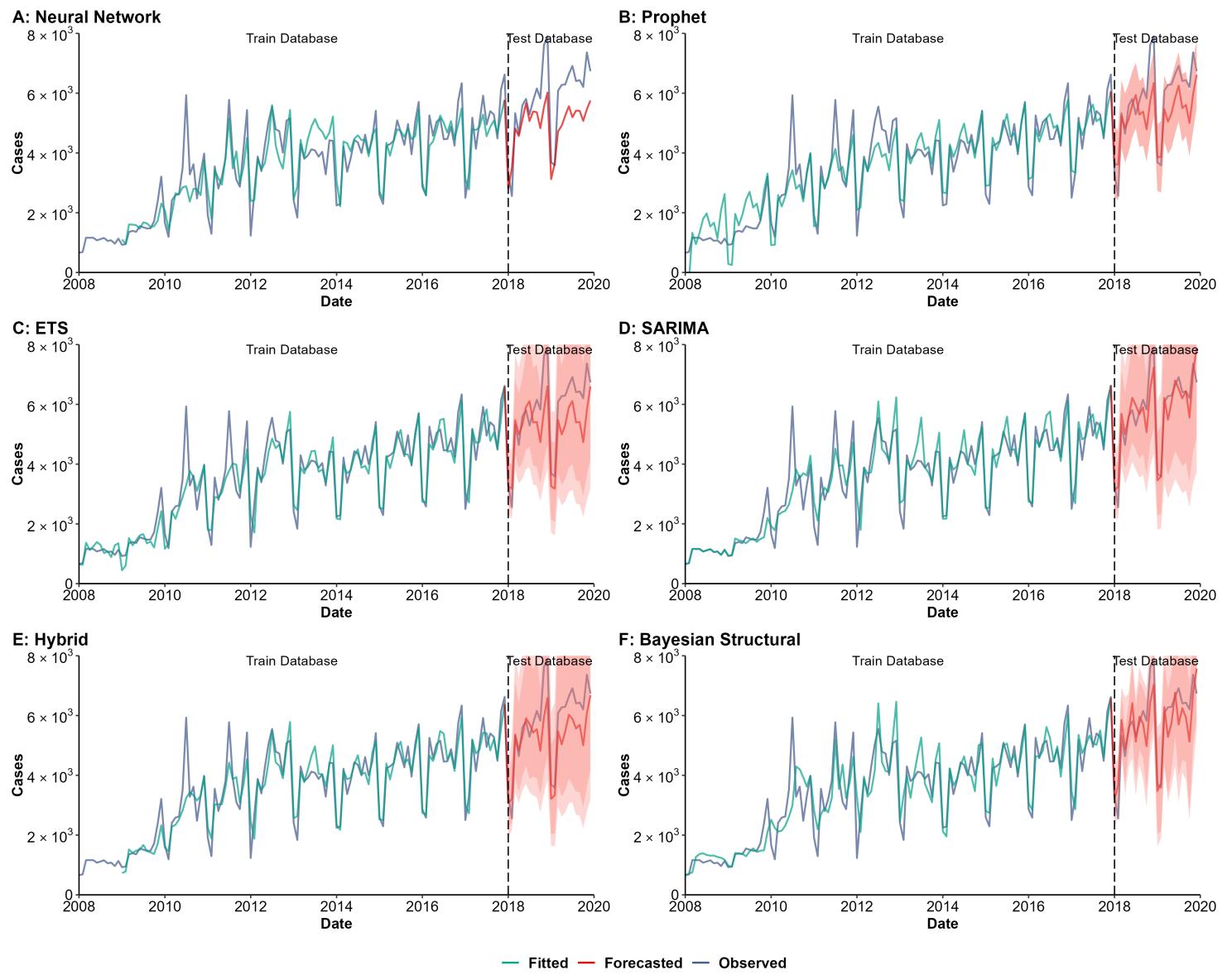
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.76	0.00	0.63
ETS	0.90	0.32	0.73
SARIMA	0.91	0.52	0.83
Hybrid*	0.89	0.61	0.84
Bayesian Structural	0.78	0.13	0.59
Prophet	0.92	0.09	0.60

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 35. Training and comparing variant time series models for gonorrhea.

(A) Neural Network model; (B) Prophet model; (C) Exponential smoothing (ETS) model; (D) Seasonal autoregressive integrated moving average (SARIMA) model; (E) Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; (F) Bayesian structural model; (G) Root mean square error (RMSE) of variant models; (H) Symmetric mean absolute percentage error (SMAPE) of variant models; (I) Mean absolute scaled error (MASE) of variant models; (J) R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	12.69	16.87	13.45
ETS	11.45	13.51	11.79
SARIMA	10.56	7.26	10.01
Hybrid*	10.15	12.07	10.50
Bayesian Structural	13.89	9.71	13.19
Prophet	19.44	13.37	18.43

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	596.33	1089.29	711.82
ETS	494.16	896.66	580.94
SARIMA	551.31	518.57	545.99
Hybrid*	491.90	803.57	561.59
Bayesian Structural	612.22	659.41	620.33
Prophet	575.63	881.76	636.95

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.70	1.64	0.83
ETS	0.42	0.97	0.60
SARIMA	0.54	0.45	0.51
Hybrid*	0.38	0.91	0.57
Bayesian Structural	0.53	0.51	0.58
Prophet	0.54	1.15	0.70

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

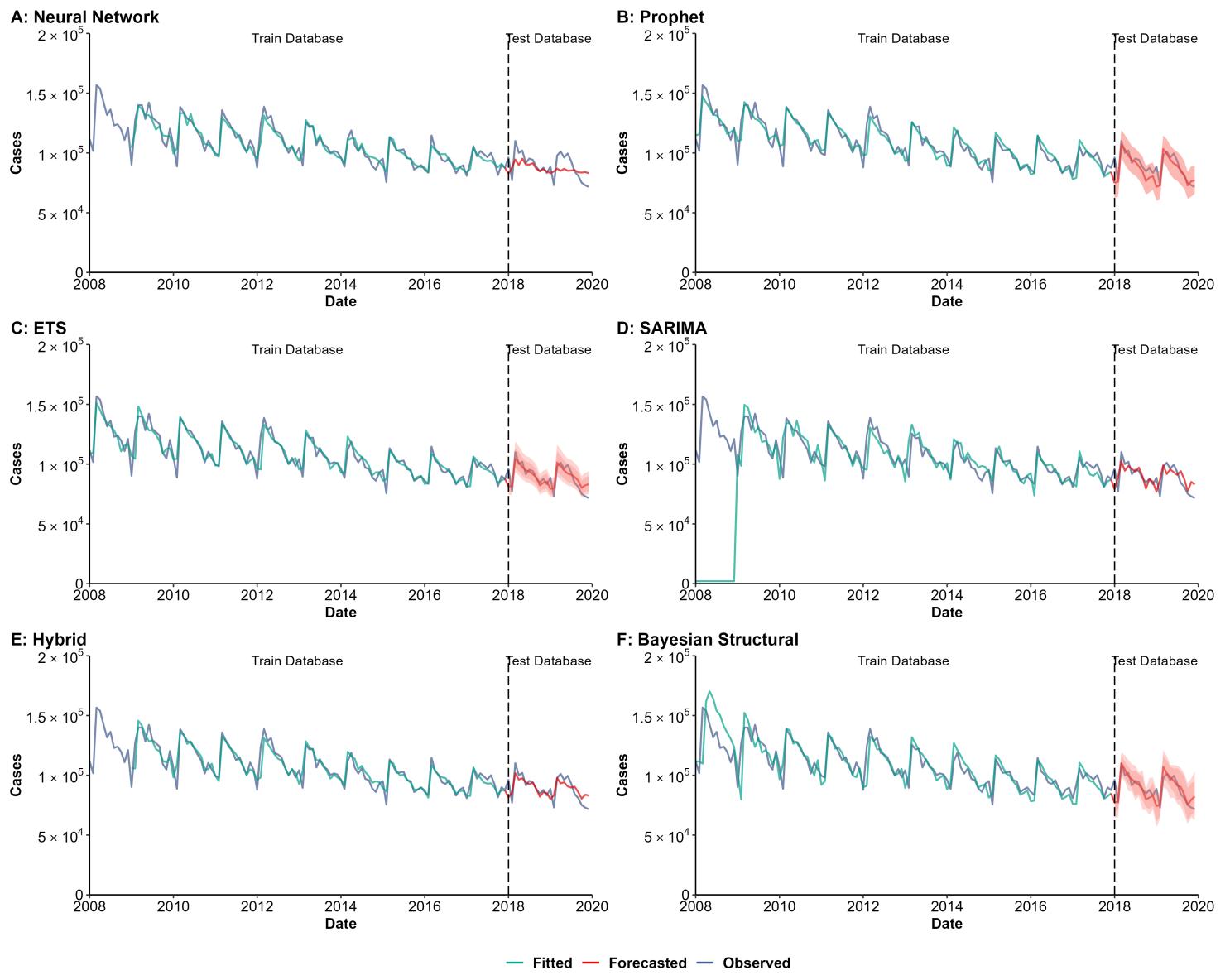
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.81	0.81	0.82
ETS	0.90	0.75	0.90
SARIMA	0.87	0.85	0.90
Hybrid*	0.87	0.83	0.89
Bayesian Structural	0.84	0.78	0.87
Prophet	0.86	0.80	0.87

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 36. Training and comparing variant time series models for acquired immunodeficiency syndrome (AIDS).

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



— Fitted — Forecasted — Observed

G : SMAPE of Models

Method	Train	Test	All
Neural Network	3.59	8.55	4.49
ETS	3.73	5.55	4.03
SARIMA	24.50	7.31	21.64
Hybrid*	3.84	6.30	4.29
Bayesian Structural	6.34	5.22	6.16
Prophet	4.17	5.62	4.41

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	5023.22	9050.78	5961.45
ETS	5942.67	5897.20	5935.12
SARIMA	40904.21	7918.45	37479.94
Hybrid*	5963.87	6701.98	6104.71
Bayesian Structural	10818.75	6471.70	10223.42
Prophet	6198.52	6883.05	6317.76

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.65	3.31	0.87
ETS	0.43	1.10	0.67
SARIMA	2.03	0.99	1.90
Hybrid*	0.46	1.32	0.73
Bayesian Structural	0.76	0.72	0.79
Prophet	0.48	0.79	0.71

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

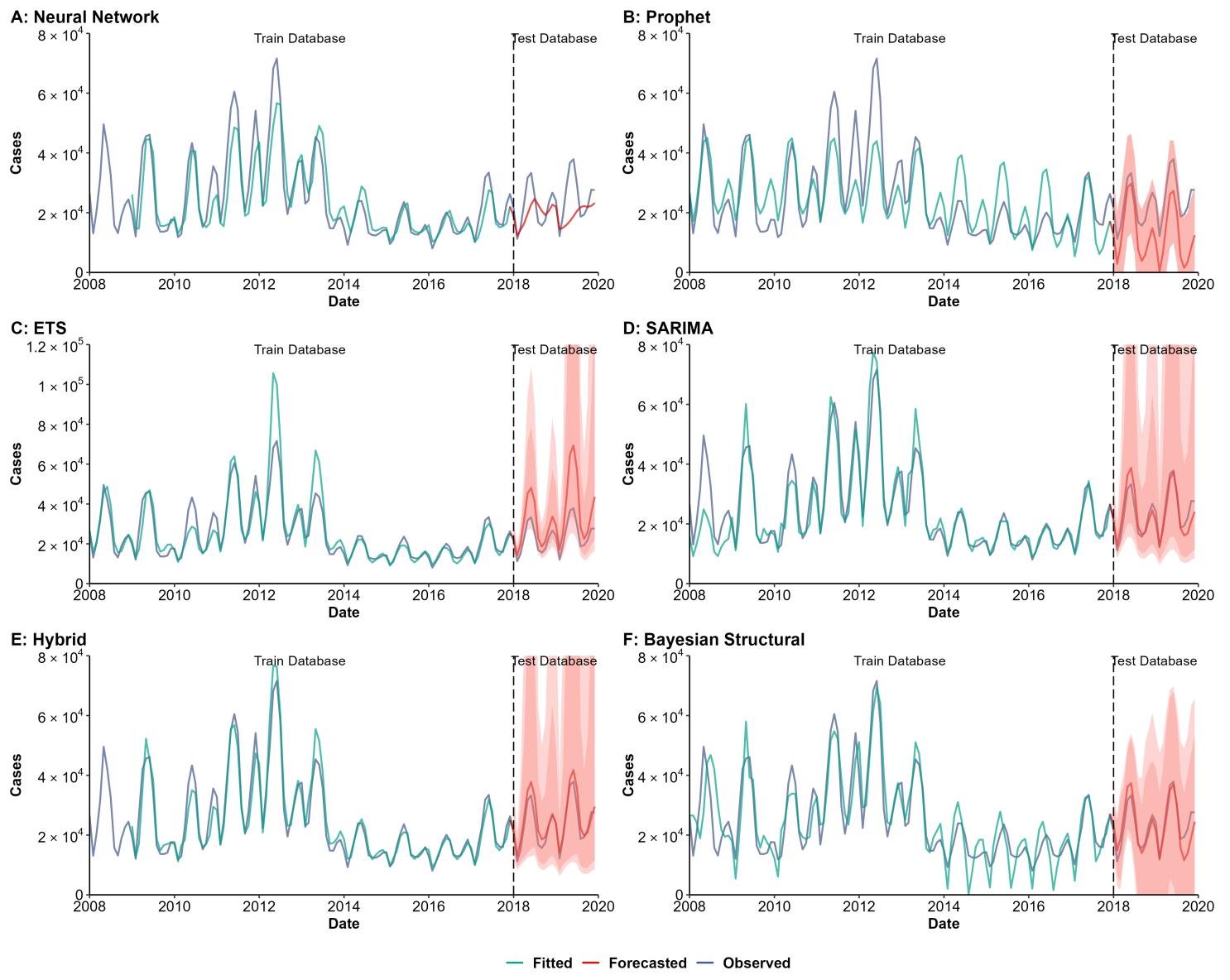
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.90	0.37	0.87
ETS	0.88	0.68	0.89
SARIMA	0.00	0.41	0.00
Hybrid*	0.85	0.62	0.86
Bayesian Structural	0.71	0.65	0.74
Prophet	0.87	0.68	0.87

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 37. Training and comparing variant time series models for tuberculosis.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	17.20	24.84	18.59
ETS	13.01	31.42	16.08
SARIMA	14.07	11.14	13.58
Hybrid*	10.09	9.76	10.03
Bayesian Structural	27.89	14.49	25.65
Prophet	27.43	76.93	35.68

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	6245.29	7846.49	6565.53
ETS	6659.86	13131.27	8105.55
SARIMA	5461.30	3226.84	5156.57
Hybrid*	3602.26	2991.79	3499.20
Bayesian Structural	6631.07	3784.71	6247.39
Prophet	8593.58	11725.78	9190.05

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.84	2.93	1.00
ETS	0.58	1.04	0.66
SARIMA	0.51	0.46	0.50
Hybrid*	0.41	0.40	0.42
Bayesian Structural	0.77	0.49	0.65
Prophet	1.00	1.65	1.12

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

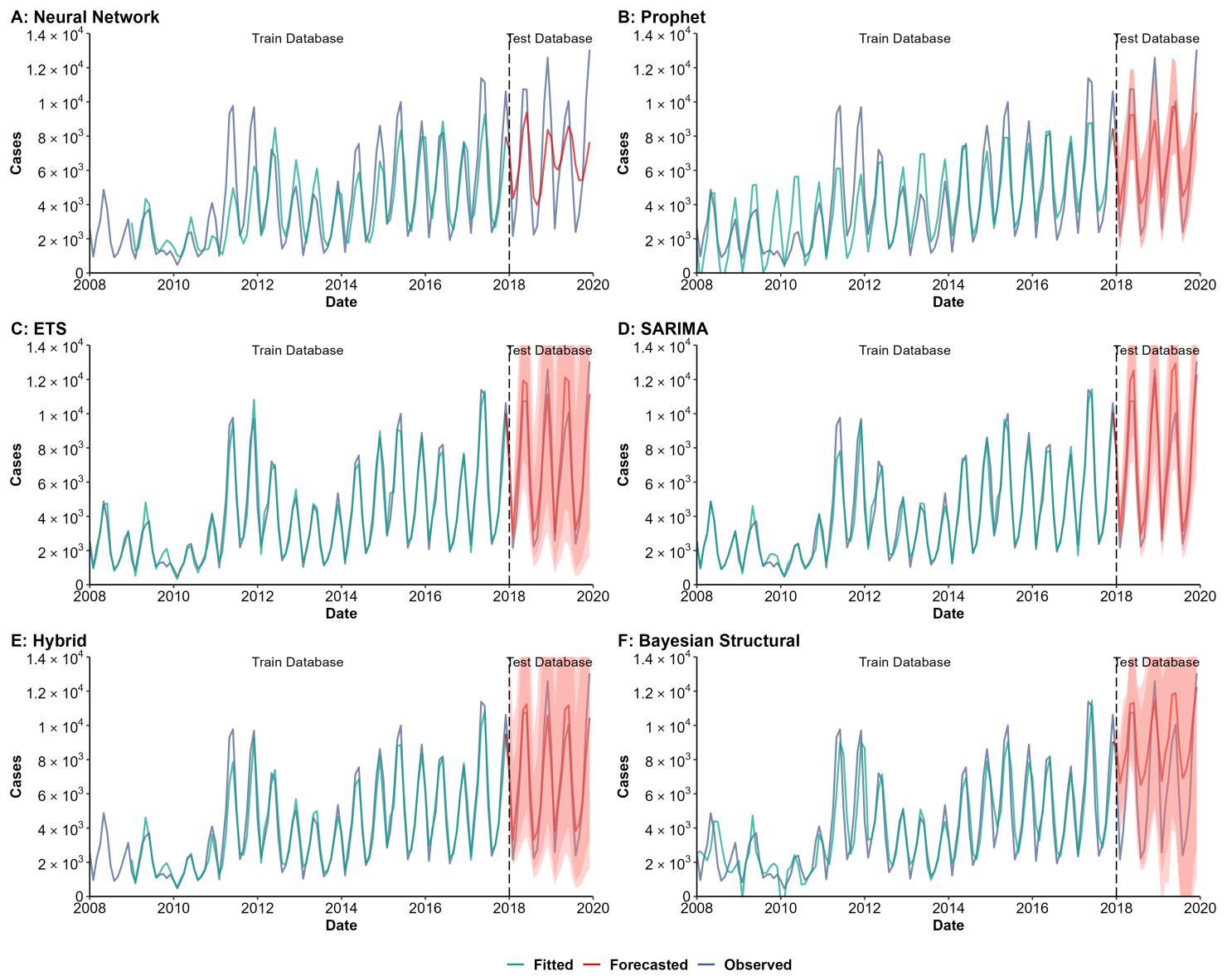
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.80	0.11	0.76
ETS	0.86	0.89	0.81
SARIMA	0.86	0.82	0.86
Hybrid*	0.94	0.92	0.93
Bayesian Structural	0.78	0.78	0.78
Prophet	0.59	0.75	0.51

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 38. Training and comparing variant time series models for mumps.

(A) Neural Network model; (B) Prophet model; (C) Exponential smoothing (ETS) model; (D) Seasonal autoregressive integrated moving average (SARIMA) model; (E) Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; (F) Bayesian structural model; (G) Root mean square error (RMSE) of variant models; (H) Symmetric mean absolute percentage error (SMAPE) of variant models; (I) Mean absolute scaled error (MASE) of variant models; (J) R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	29.95	32.52	30.42
ETS	11.03	17.80	12.16
SARIMA	10.42	16.30	11.40
Hybrid*	13.05	18.45	14.03
Bayesian Structural	28.96	40.55	30.89
Prophet	37.27	25.20	35.26

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	1559.72	2410.73	1745.58
ETS	510.50	1260.24	694.17
SARIMA	572.97	1233.45	726.05
Hybrid*	682.86	1223.35	808.47
Bayesian Structural	1171.60	2831.52	1574.84
Prophet	1374.36	1736.30	1441.01

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.84	1.62	0.97
ETS	0.22	0.40	0.26
SARIMA	0.24	0.32	0.26
Hybrid*	0.28	0.44	0.34
Bayesian Structural	0.52	1.52	0.78
Prophet	0.63	0.89	0.68

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

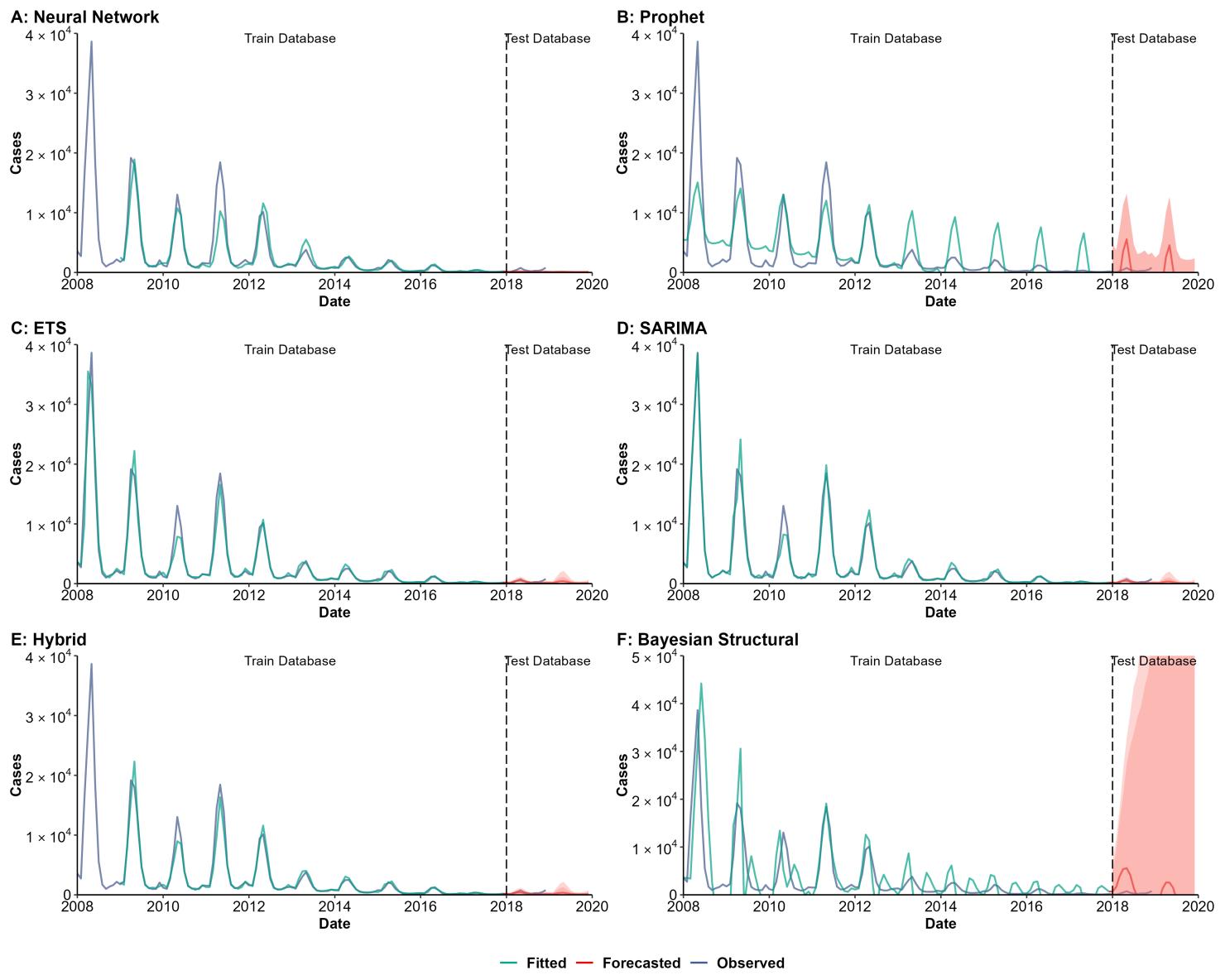
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.67	0.61	0.67
ETS	0.96	0.88	0.95
SARIMA	0.95	0.92	0.94
Hybrid*	0.94	0.90	0.93
Bayesian Structural	0.80	0.92	0.75
Prophet	0.73	0.88	0.77

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 39. Training and comparing variant time series models for scarlet fever.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	22.14	87.36	28.66
ETS	15.11	57.56	18.97
SARIMA	14.79	62.87	19.16
Hybrid*	13.89	61.98	18.70
Bayesian Structural	111.03	176.40	116.97
Prophet	99.52	184.44	107.24

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	1574.73	316.34	1497.26
ETS	1422.12	232.81	1357.75
SARIMA	1058.62	243.10	1012.02
Hybrid*	944.81	246.12	899.70
Bayesian Structural	5302.93	3056.49	5139.45
Prophet	3847.97	3932.05	3855.69

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.59	12.59	0.61
ETS	0.33	2.17	0.36
SARIMA	0.23	2.55	0.24
Hybrid*	0.32	3.02	0.34
Bayesian Structural	1.80	2.26	0.96
Prophet	1.44	2.03	1.50

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

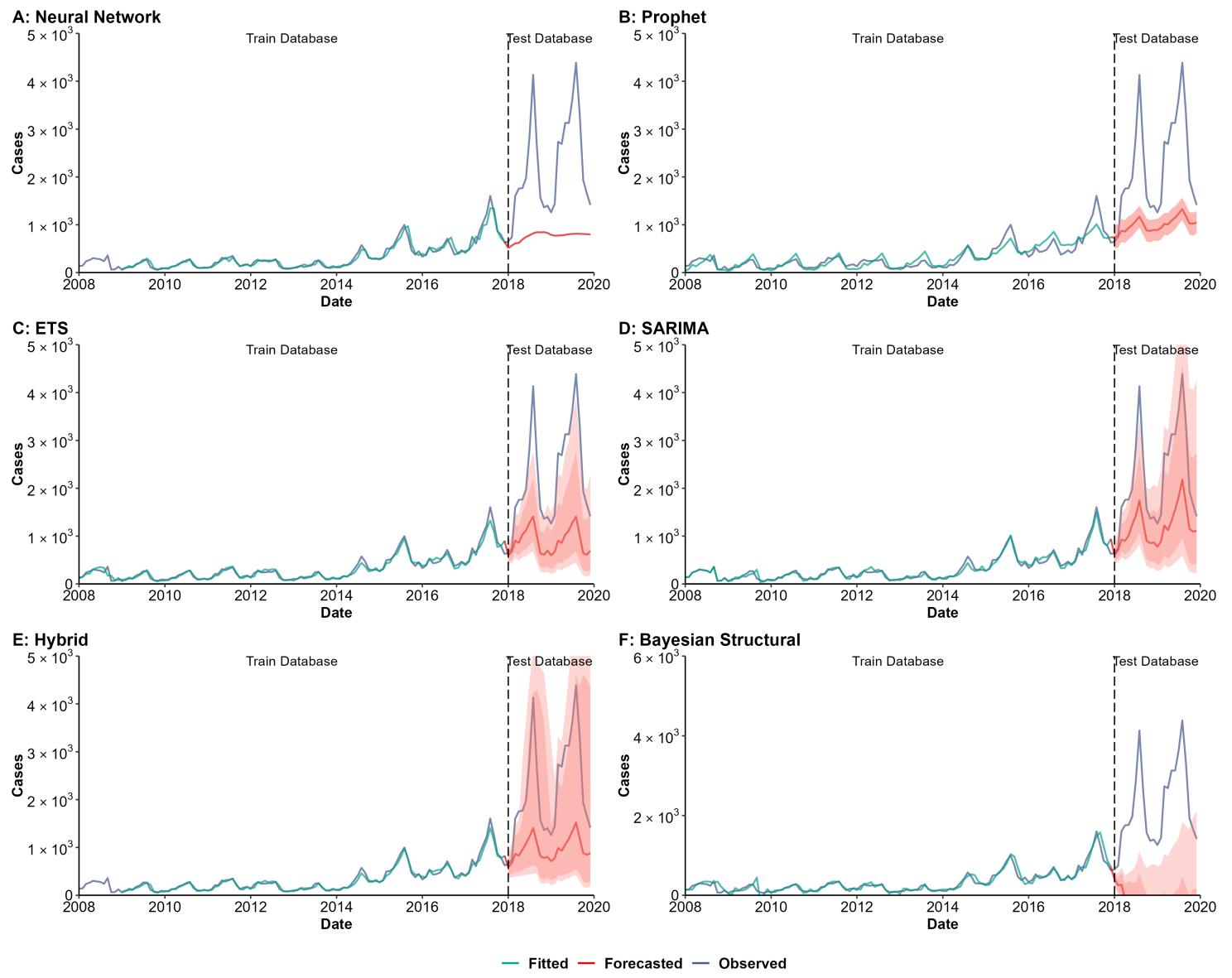
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.86	0.28	0.86
ETS	0.94	0.21	0.94
SARIMA	0.97	0.20	0.97
Hybrid*	0.95	0.23	0.95
Bayesian Structural	0.51	0.02	0.51
Prophet	0.56	0.26	0.53

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 40. Training and comparing variant time series models for rubella.

(A) Neural Network model; (B) Prophet model; (C) Exponential smoothing (ETS) model; (D) Seasonal autoregressive integrated moving average (SARIMA) model; (E) Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; (F) Bayesian structural model; (G) Root mean square error (RMSE) of variant models; (H) Symmetric mean absolute percentage error (SMAPE) of variant models; (I) Mean absolute scaled error (MASE) of variant models; (J) R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	13.04	86.75	26.44
ETS	14.40	77.02	24.83
SARIMA	13.86	54.61	20.65
Hybrid*	11.52	69.48	22.06
Bayesian Structural	23.53	187.05	50.78
Prophet	29.91	66.39	35.99

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	68.01	1745.48	746.81
ETS	62.89	1530.74	627.55
SARIMA	59.63	1221.68	501.71
Hybrid*	51.60	1466.90	627.23
Bayesian Structural	90.84	4006.62	1637.80
Prophet	119.39	1497.63	621.04

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.68	71.99	5.30
ETS	0.55	8.19	3.17
SARIMA	0.54	4.86	2.14
Hybrid*	0.45	8.80	3.28
Bayesian Structural	0.78	19.78	6.38
Prophet	1.15	17.88	4.26

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

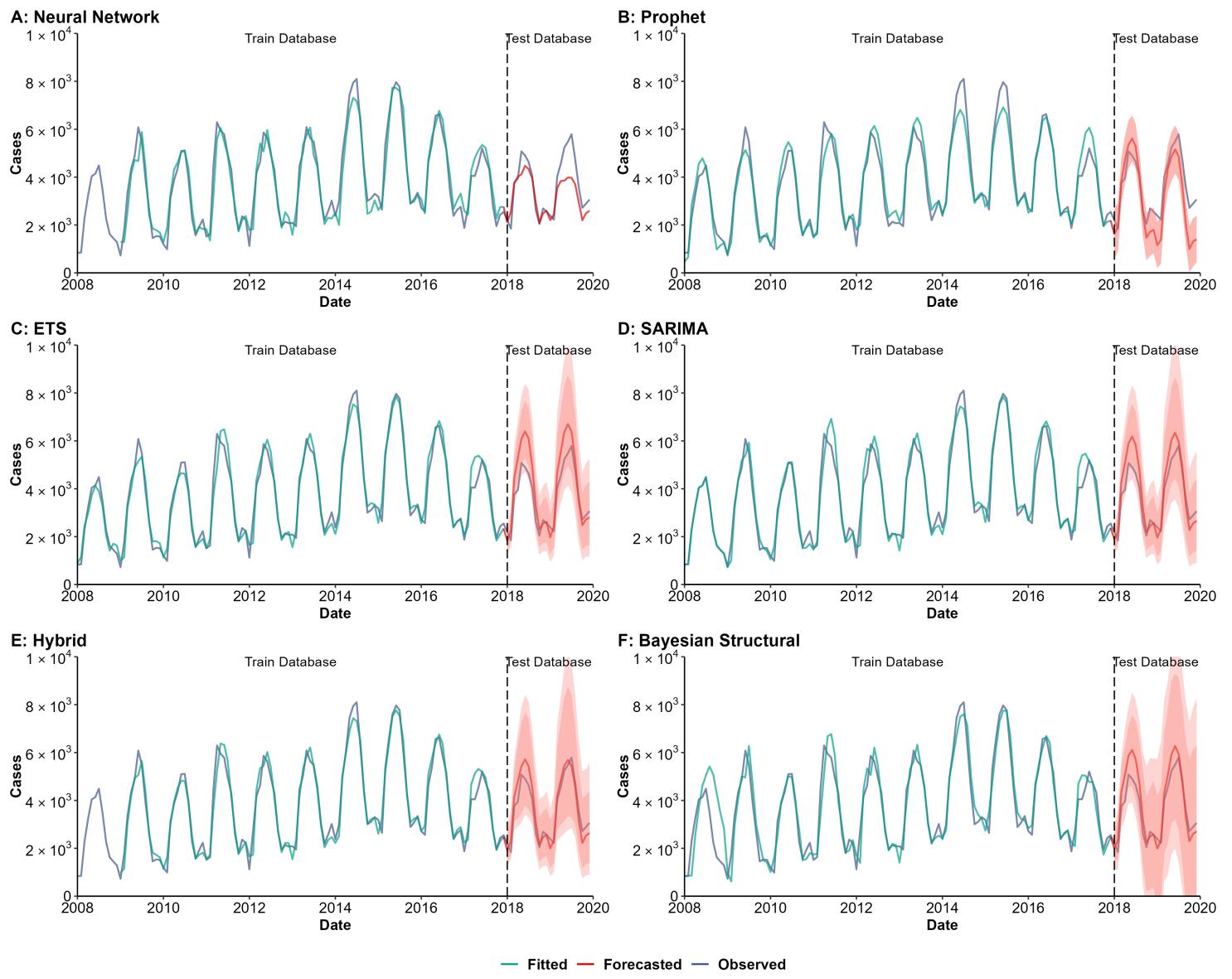
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.94	0.24	0.53
ETS	0.95	0.76	0.76
SARIMA	0.95	0.91	0.89
Hybrid*	0.97	0.91	0.80
Bayesian Structural	0.90	0.09	0.39
Prophet	0.81	0.85	0.75

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 41. Training and comparing variant time series models for pertussis.

(A) Neural Network model; (B) Prophet model; (C) Exponential smoothing (ETS) model; (D) Seasonal autoregressive integrated moving average (SARIMA) model; (E) Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; (F) Bayesian structural model; (G) Root mean square error (RMSE) of variant models; (H) Symmetric mean absolute percentage error (SMAPE) of variant models; (I) Mean absolute scaled error (MASE) of variant models; (J) R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	12.10	14.31	12.51
ETS	9.63	15.24	10.57
SARIMA	9.00	13.31	9.72
Hybrid*	8.86	10.69	9.19
Bayesian Structural	15.36	12.61	14.90
Prophet	10.97	29.08	13.99

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	475.82	716.22	527.74
ETS	401.99	774.15	484.30
SARIMA	427.32	619.37	464.87
Hybrid*	383.27	426.84	391.55
Bayesian Structural	683.38	583.40	667.76
Prophet	502.83	899.30	587.78

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.47	1.26	0.55
ETS	0.37	0.77	0.46
SARIMA	0.37	0.66	0.42
Hybrid*	0.35	0.53	0.40
Bayesian Structural	0.58	0.63	0.60
Prophet	0.46	0.97	0.57

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

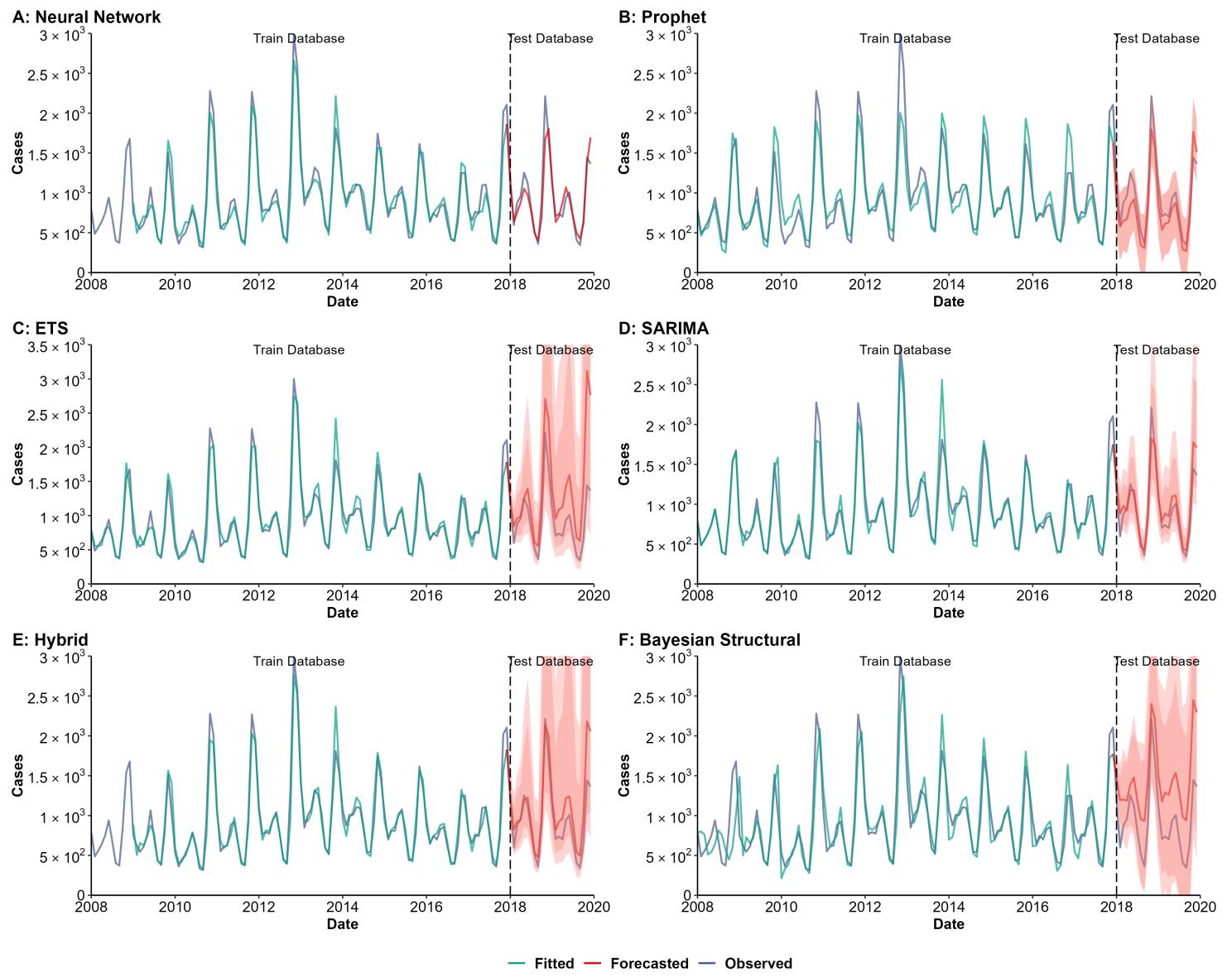
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.93	0.81	0.91
ETS	0.95	0.94	0.93
SARIMA	0.95	0.93	0.94
Hybrid*	0.95	0.92	0.95
Bayesian Structural	0.86	0.93	0.86
Prophet	0.92	0.82	0.89

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 42. Training and comparing variant time series models for brucellosis.

(A) Neural Network model; (B) Prophet model; (C) Exponential smoothing (ETS) model; (D) Seasonal autoregressive integrated moving average (SARIMA) model; (E) Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; (F) Bayesian structural model; (G) Root mean square error (RMSE) of variant models; (H) Symmetric mean absolute percentage error (SMAPE) of variant models; (I) Mean absolute scaled error (MASE) of variant models; (J) R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	9.72	11.89	10.12
ETS	9.07	34.99	13.39
SARIMA	8.90	12.89	9.57
Hybrid*	7.93	19.15	9.97
Bayesian Structural	16.77	47.16	21.84
Prophet	14.22	21.11	15.37

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	129.04	163.86	136.04
ETS	138.29	573.63	266.04
SARIMA	151.84	162.02	153.58
Hybrid*	125.31	263.86	159.71
Bayesian Structural	235.53	541.45	308.37
Prophet	207.86	204.73	207.34

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.32	0.41	0.33
ETS	0.29	0.95	0.43
SARIMA	0.29	0.44	0.31
Hybrid*	0.25	0.58	0.32
Bayesian Structural	0.50	1.77	0.65
Prophet	0.45	0.61	0.48

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

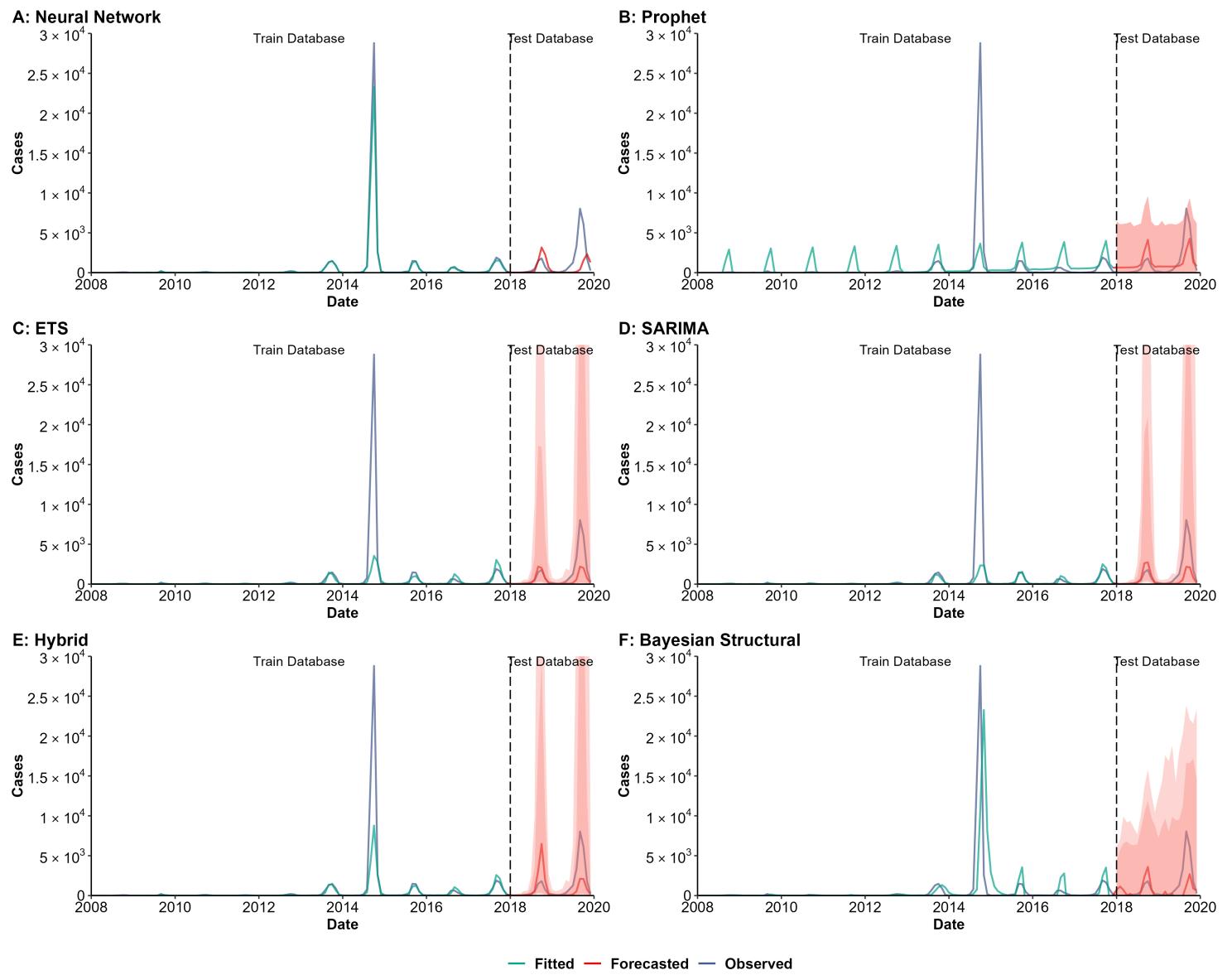
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.94	0.86	0.93
ETS	0.92	0.72	0.78
SARIMA	0.91	0.88	0.90
Hybrid*	0.94	0.85	0.90
Bayesian Structural	0.78	0.79	0.67
Prophet	0.82	0.87	0.82

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 43. Training and comparing variant time series models for hemorrhagic fever with renal syndrome (HFRS).

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	13.47	101.01	29.39
ETS	56.40	74.00	59.34
SARIMA	55.32	74.99	58.60
Hybrid*	42.32	81.47	49.44
Bayesian Structural	116.22	137.74	119.80
Prophet	153.04	110.23	145.90

H : RMSE of Models

Method	Train	Test	All
Neural Network	588.47	2016.50	1011.27
ETS	2606.24	1602.72	2467.49
SARIMA	2722.23	1620.51	2571.60
Hybrid*	2179.23	1915.16	2133.65
Bayesian Structural	2967.59	1848.96	2812.22
Prophet	2733.32	1411.41	2560.83

I : MASE of Models

Method	Train	Test	All
Neural Network	0.17	2.34	0.49
ETS	0.67	1.94	2.13
SARIMA	2.60	1.87	2.36
Hybrid*	0.52	1.35	1.26
Bayesian Structural	1.29	1.34	1.17
Prophet	1.50	1.60	1.53

J : R_Squared of Models

Method	Train	Test	All
Neural Network	1.00	0.07	0.91
ETS	0.44	0.60	0.44
SARIMA	0.31	0.47	0.29
Hybrid*	0.88	0.19	0.66
Bayesian Structural	0.17	0.21	0.17
Prophet	0.14	0.53	0.17

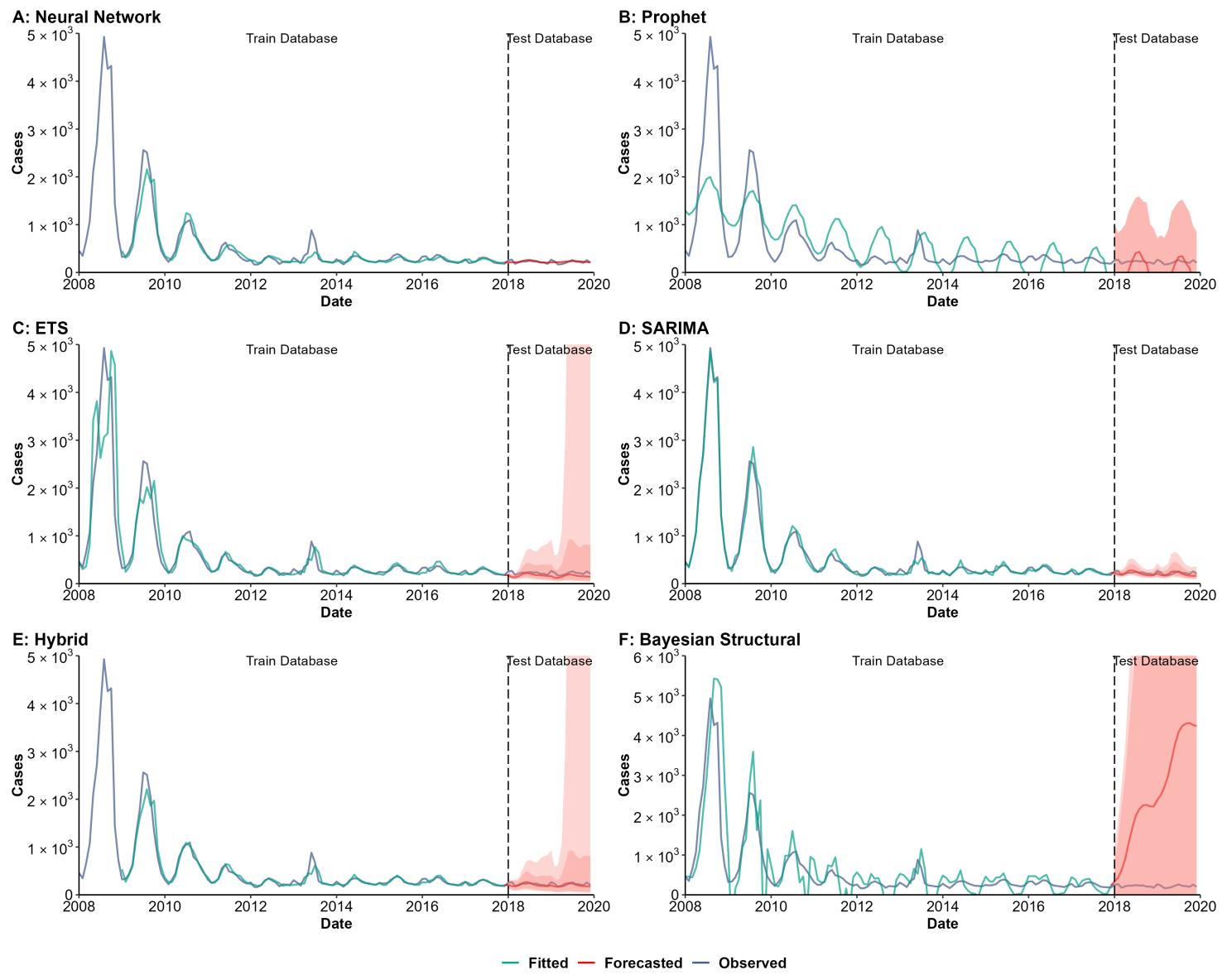
*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 44. Training and comparing variant time series models for dengue fever.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	15.18	10.57	14.34
ETS	18.55	29.20	20.32
SARIMA	12.44	15.32	12.92
Hybrid*	11.66	13.25	11.95
Bayesian Structural	68.73	153.70	82.89
Prophet	82.34	126.75	89.74

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	143.11	28.44	130.02
ETS	435.55	64.23	398.46
SARIMA	108.42	39.93	100.31
Hybrid*	119.81	36.61	109.49
Bayesian Structural	595.78	2665.33	1216.47
Prophet	593.95	401.31	566.41

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.91	3.21	0.96
ETS	0.99	3.56	0.95
SARIMA	0.33	1.53	0.36
Hybrid*	0.56	1.64	0.66
Bayesian Structural	2.00	13.03	1.88
Prophet	2.32	2.27	2.63

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

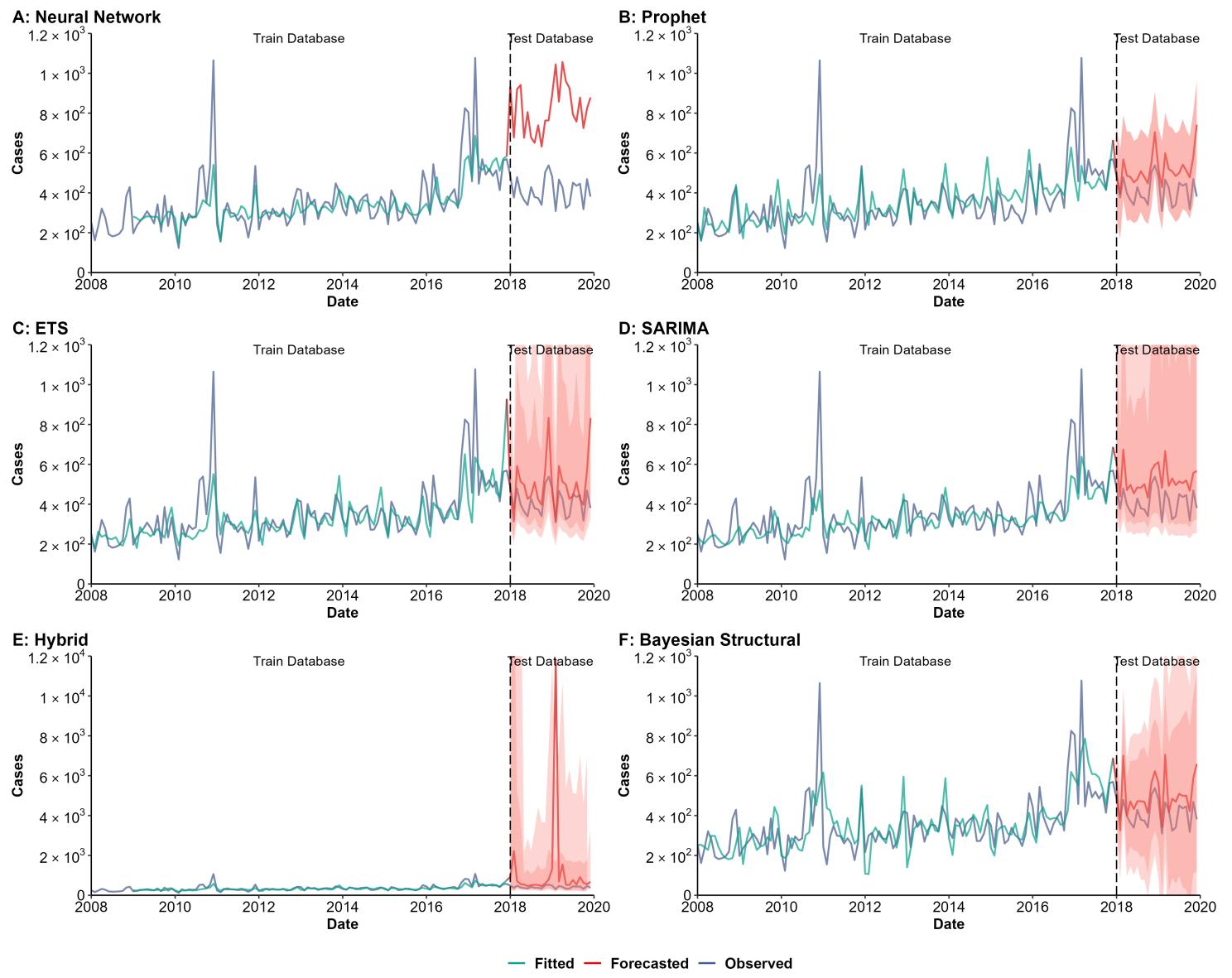
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.89	0.09	0.90
ETS	0.76	0.14	0.77
SARIMA	0.98	0.11	0.98
Hybrid*	0.92	0.12	0.92
Bayesian Structural	0.69	0.01	0.26
Prophet	0.52	0.05	0.49

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 45. Training and comparing variant time series models for malaria.

(A) Neural Network model; (B) Prophet model; (C) Exponential smoothing (ETS) model; (D) Seasonal autoregressive integrated moving average (SARIMA) model; (E) Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; (F) Bayesian structural model; (G) Root mean square error (RMSE) of variant models; (H) Symmetric mean absolute percentage error (SMAPE) of variant models; (I) Mean absolute scaled error (MASE) of variant models; (J) R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	14.55	66.46	23.99
ETS	18.07	20.33	18.45
SARIMA	19.26	25.01	20.22
Hybrid*	15.43	54.80	22.59
Bayesian Structural	23.15	20.69	22.74
Prophet	18.95	23.37	19.68

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	96.22	433.97	204.49
ETS	108.04	138.06	113.59
SARIMA	110.36	125.15	112.96
Hybrid*	96.36	2400.20	1027.15
Bayesian Structural	119.46	117.68	119.17
Prophet	109.85	128.52	113.18

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	1.34	3.41	2.07
ETS	0.68	0.81	0.94
SARIMA	1.51	1.54	1.52
Hybrid*	0.58	0.65	0.74
Bayesian Structural	0.83	0.82	1.06
Prophet	0.71	1.46	1.01

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

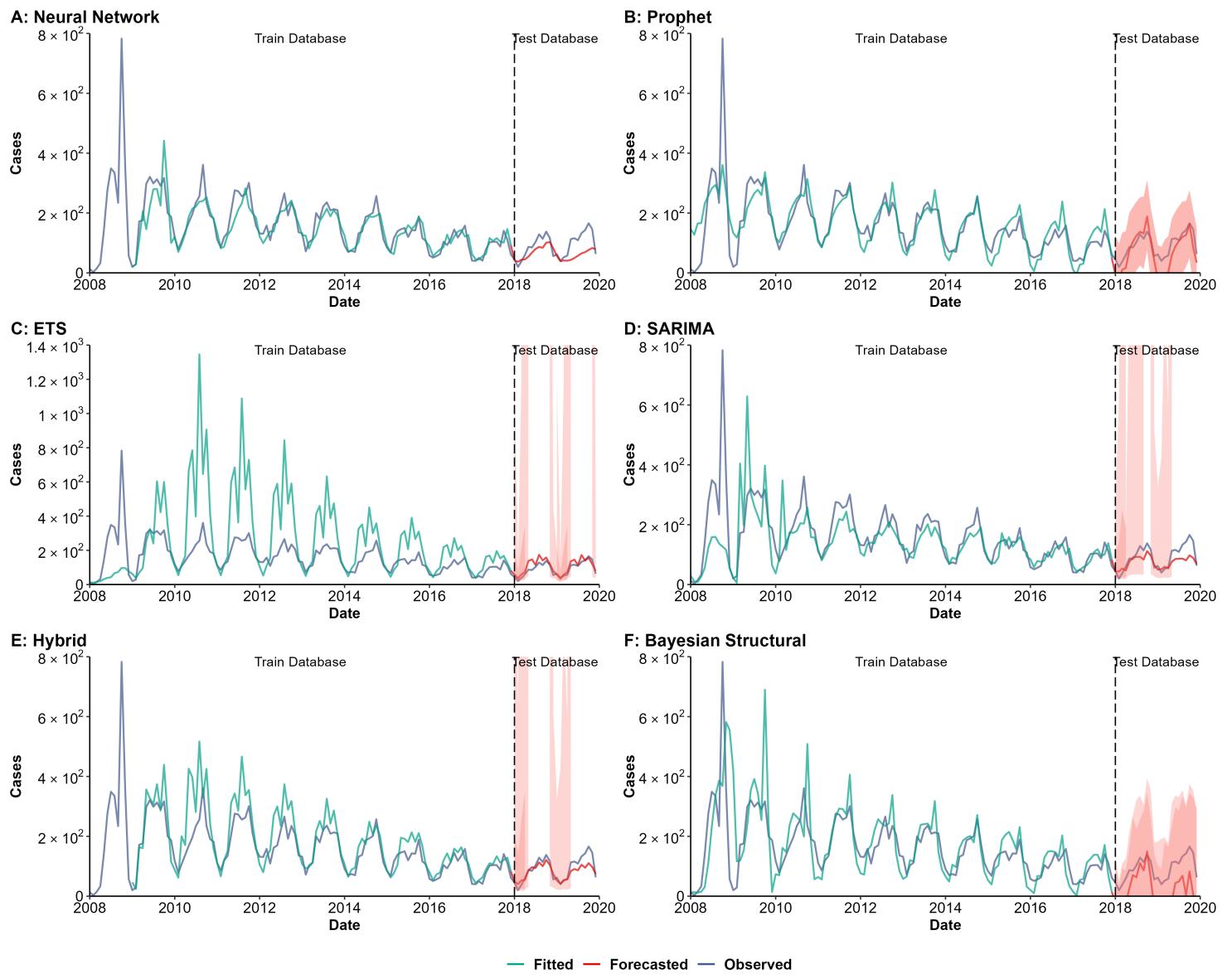
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.66	0.00	0.18
ETS	0.51	0.27	0.43
SARIMA	0.52	0.51	0.40
Hybrid*	0.64	0.09	0.00
Bayesian Structural	0.42	0.45	0.41
Prophet	0.47	0.28	0.40

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 46. Training and comparing variant time series models for echinococcosis.

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	18.03	39.35	21.91
ETS	52.67	22.17	47.58
SARIMA	28.80	27.28	28.55
Hybrid*	22.62	20.16	22.17
Bayesian Structural	39.33	131.59	54.71
Prophet	31.91	74.19	38.96

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	39.35	41.79	39.81
ETS	231.63	25.59	211.70
SARIMA	91.29	30.13	84.23
Hybrid*	65.05	23.13	59.66
Bayesian Structural	99.99	85.32	97.70
Prophet	61.17	40.59	58.25

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.86	4.02	1.02
ETS	3.02	0.64	1.03
SARIMA	1.08	2.09	1.13
Hybrid*	1.19	1.23	0.74
Bayesian Structural	1.26	1.83	1.03
Prophet	0.82	0.96	0.95

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

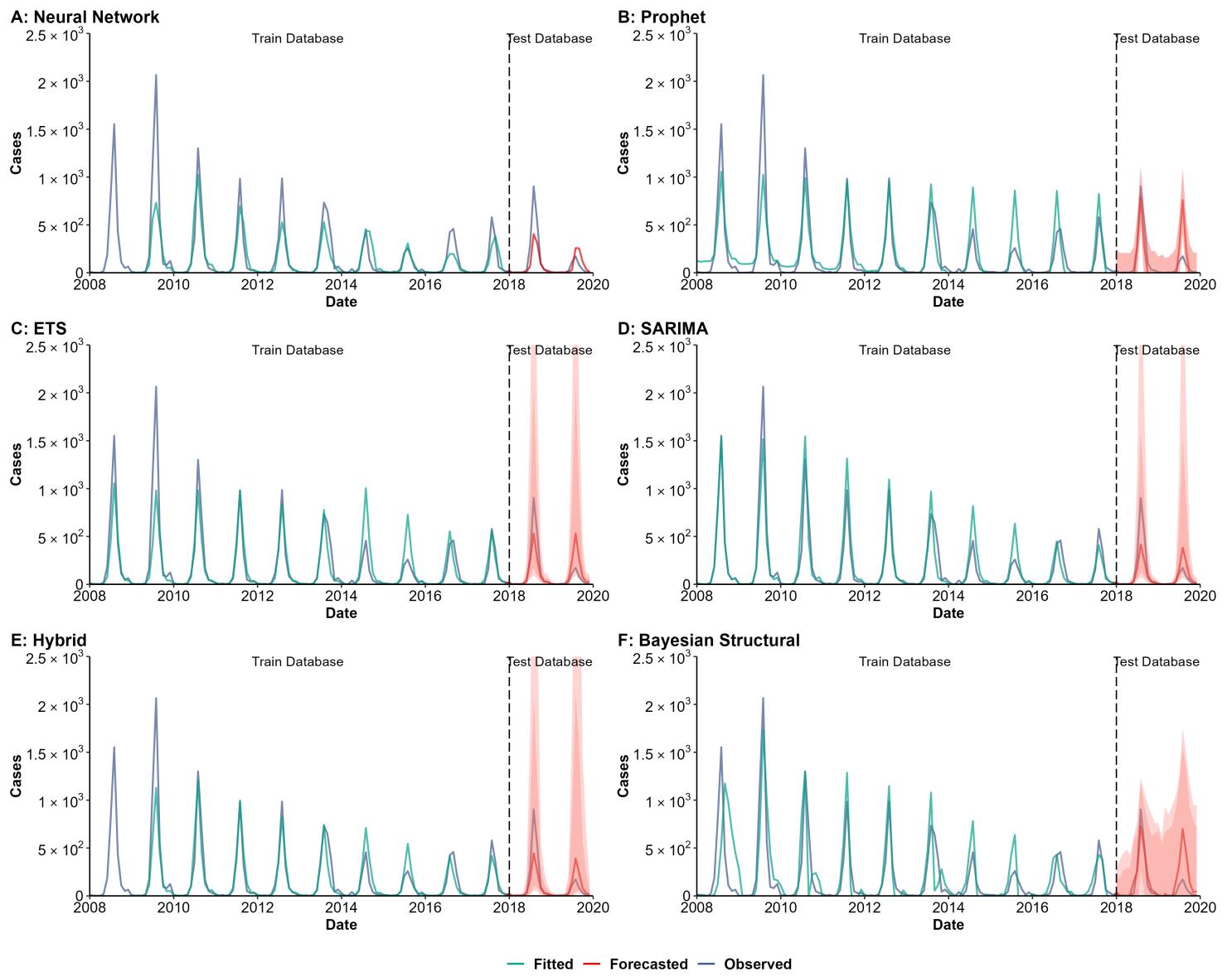
J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.73	0.41	0.74
ETS	0.20	0.80	0.24
SARIMA	0.30	0.77	0.34
Hybrid*	0.75	0.84	0.76
Bayesian Structural	0.40	0.54	0.44
Prophet	0.63	0.80	0.64

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 47. Training and comparing variant time series models for typhus.

(A) Neural Network model; (B) Prophet model; (C) Exponential smoothing (ETS) model; (D) Seasonal autoregressive integrated moving average (SARIMA) model; (E) Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; (F) Bayesian structural model; (G) Root mean square error (RMSE) of variant models; (H) Symmetric mean absolute percentage error (SMAPE) of variant models; (I) Mean absolute scaled error (MASE) of variant models; (J) R-squared of variant models.



G : SMAPE of Models

Method	Train	Test	All
Neural Network	53.88	70.31	56.87
ETS	49.46	65.67	52.16
SARIMA	45.72	56.46	47.51
Hybrid*	46.12	56.36	47.98
Bayesian Structural	120.67	116.21	119.93
Prophet	114.51	165.91	123.08

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

H : RMSE of Models

Method	Train	Test	All
Neural Network	175.95	128.55	168.33
ETS	166.39	128.12	160.65
SARIMA	119.26	129.37	121.00
Hybrid*	133.46	124.68	131.90
Bayesian Structural	239.91	150.99	227.51
Prophet	173.93	180.53	175.05

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

I : MASE of Models

Method	Train	Test	All
Neural Network	0.79	1.08	0.83
ETS	0.44	0.70	0.52
SARIMA	0.33	0.86	0.37
Hybrid*	0.37	0.81	0.47
Bayesian Structural	0.88	0.64	0.70
Prophet	0.65	0.93	0.71

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

J : R_Squared of Models

Method	Train	Test	All
Neural Network	0.75	0.71	0.75
ETS	0.76	0.61	0.75
SARIMA	0.87	0.66	0.85
Hybrid*	0.83	0.68	0.82
Bayesian Structural	0.56	0.61	0.57
Prophet	0.72	0.63	0.69

*Hybrid: Combined SARIMA, ETS, STL and Neural Network model

Supplementary Fig. 48. Training and comparing variant time series models for Japanese encephalitis (JE).

(A) Neural Network model; **(B)** Prophet model; **(C)** Exponential smoothing (ETS) model; **(D)** Seasonal autoregressive integrated moving average (SARIMA) model; **(E)** Hybrid models combining SARIMA, ETS, STL (seasonal and trend decomposition using loess), and neural network model; **(F)** Bayesian structural model; **(G)** Root mean square error (RMSE) of variant models; **(H)** Symmetric mean absolute percentage error (SMAPE) of variant models; **(I)** Mean absolute scaled error (MASE) of variant models; **(J)** R-squared of variant models.