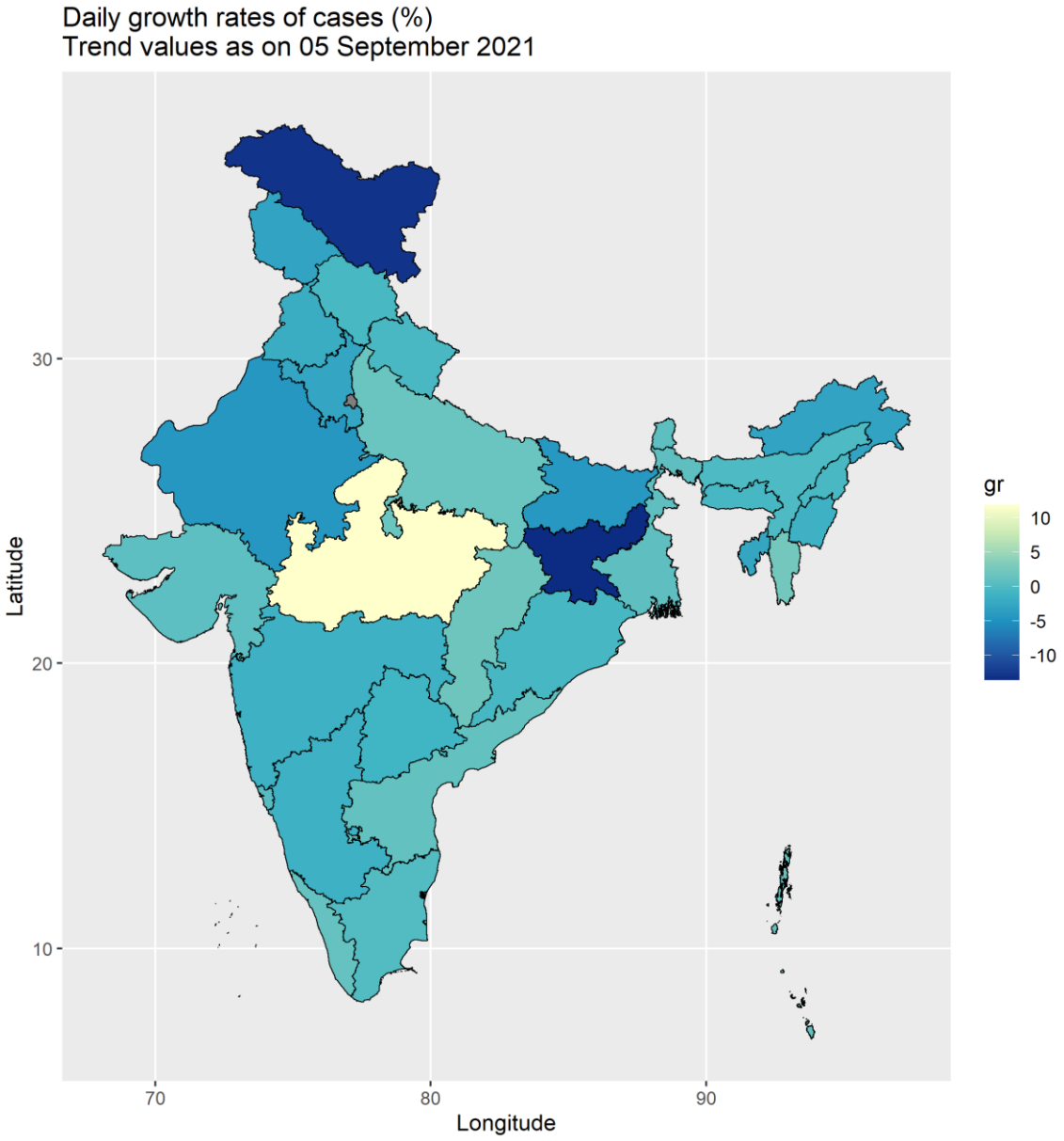
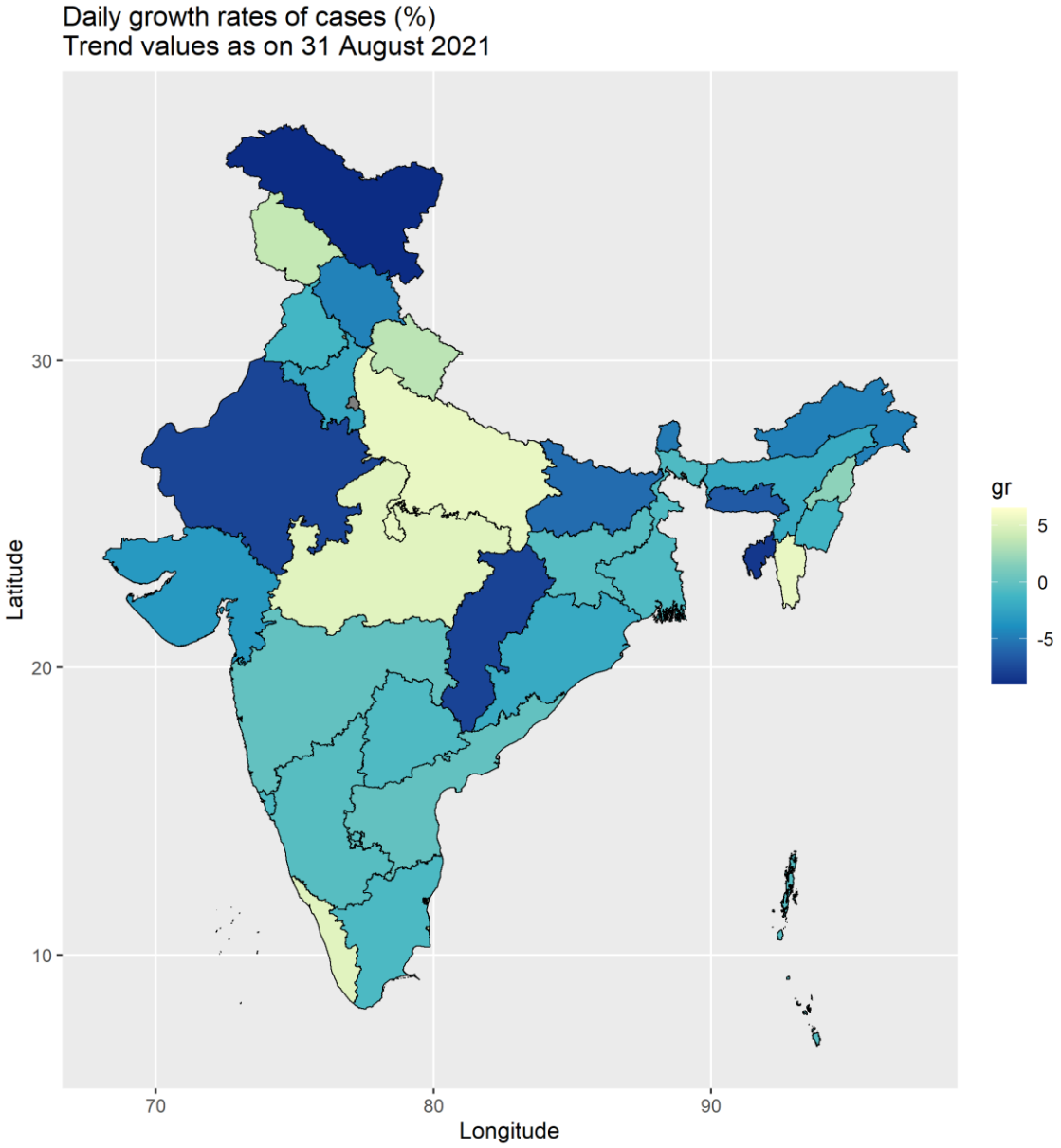
Cambridge Judge Business School
Cambridge Centre for Health Leadership & Enterprise

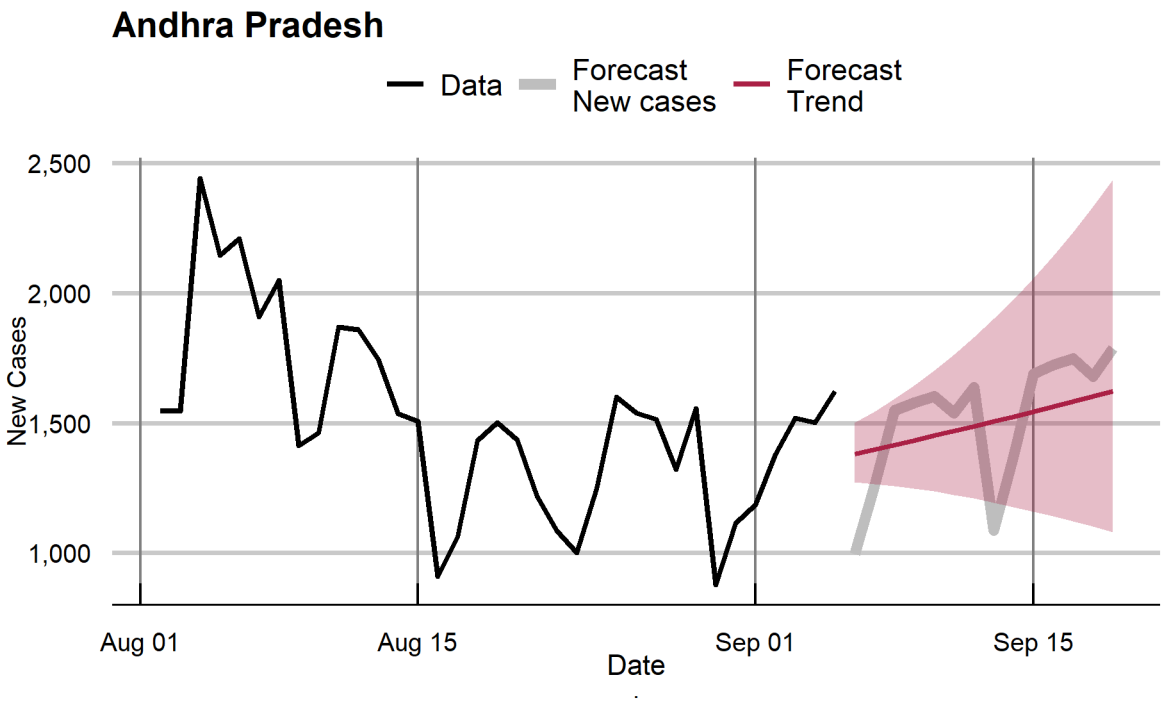
COVID-19 TRACKER: INDIA

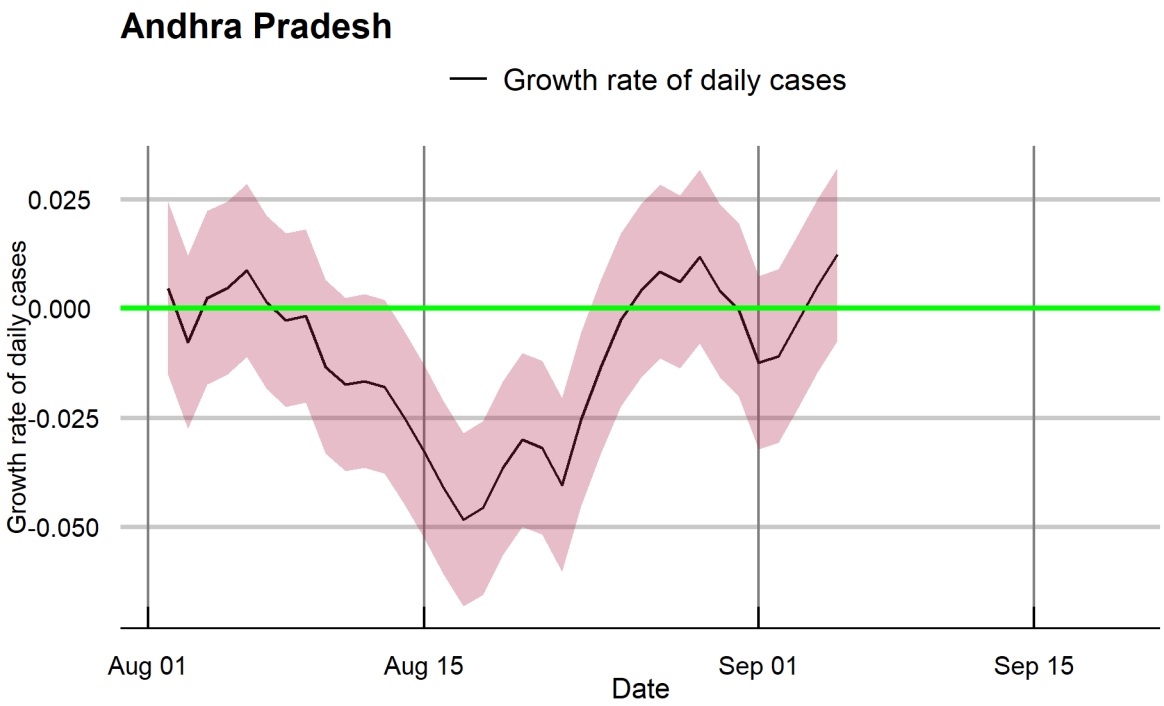
5 September 2021

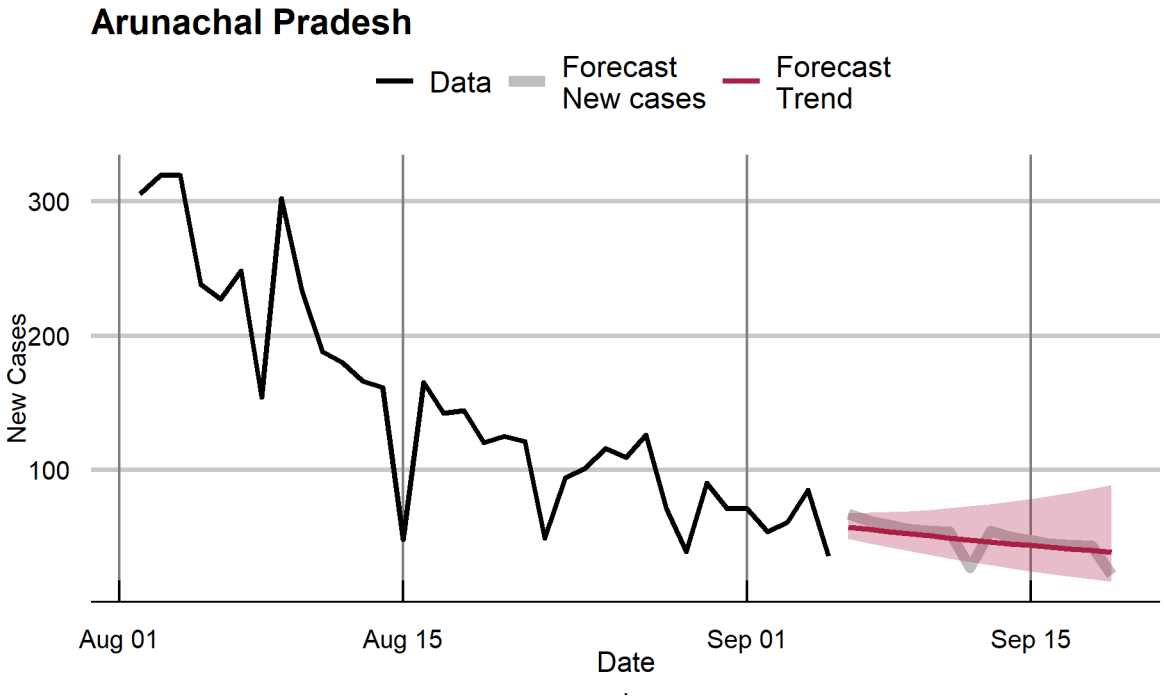

Daily growth rates of cases (%)
Trend values as on 05 September 2021
Latitude
30
20
10
70
80
90
Longitude
gr
10
5
0
-5
-10

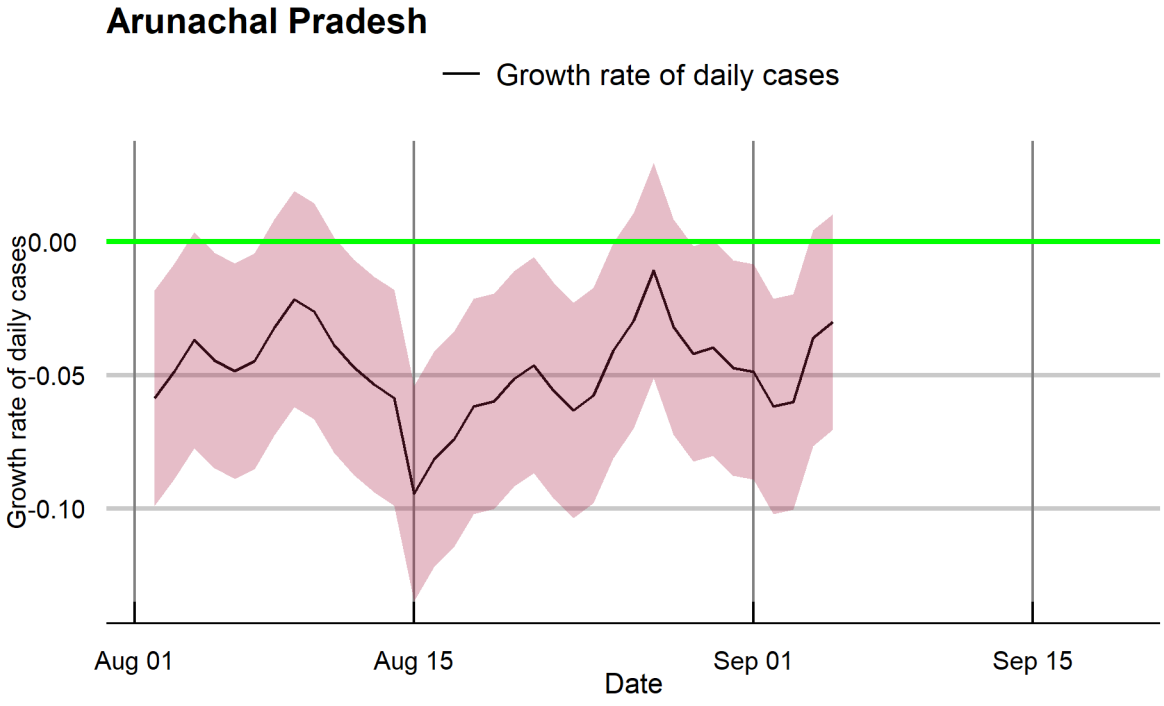

Daily growth rates of cases (%)
Trend values as on 31 August 2021
Latitude
30
20
10
70
80
90
Longitude
gr
5
0
-5

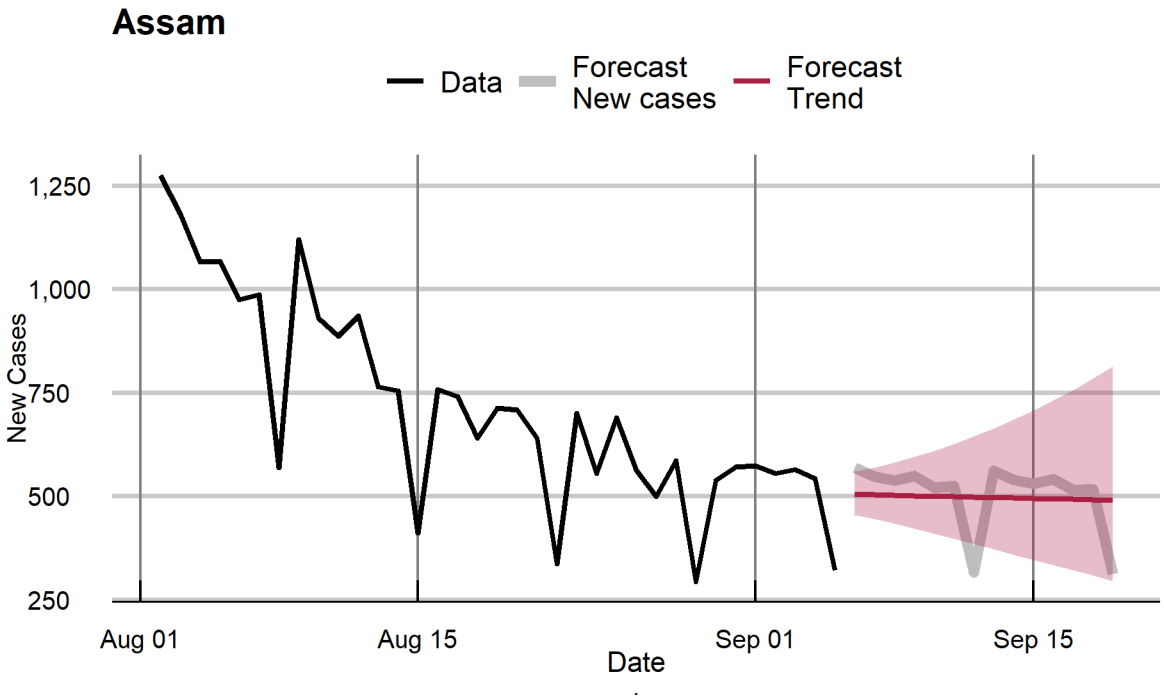
Case forecast s and growth rates : States and Union territories

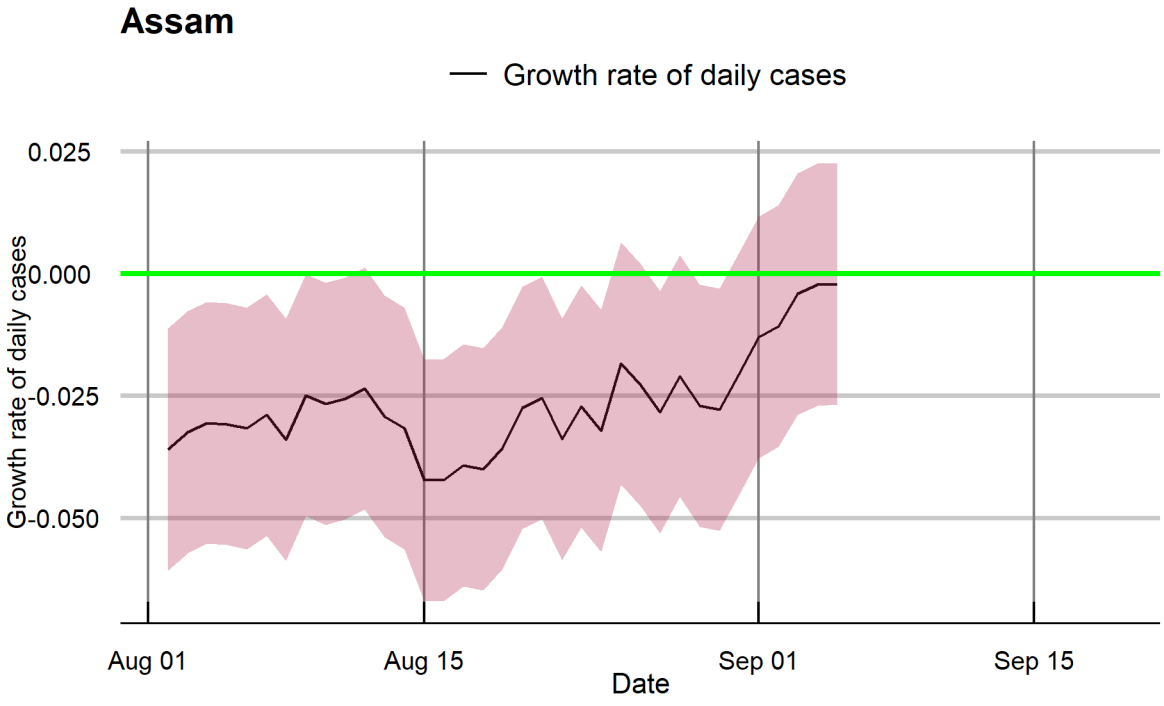


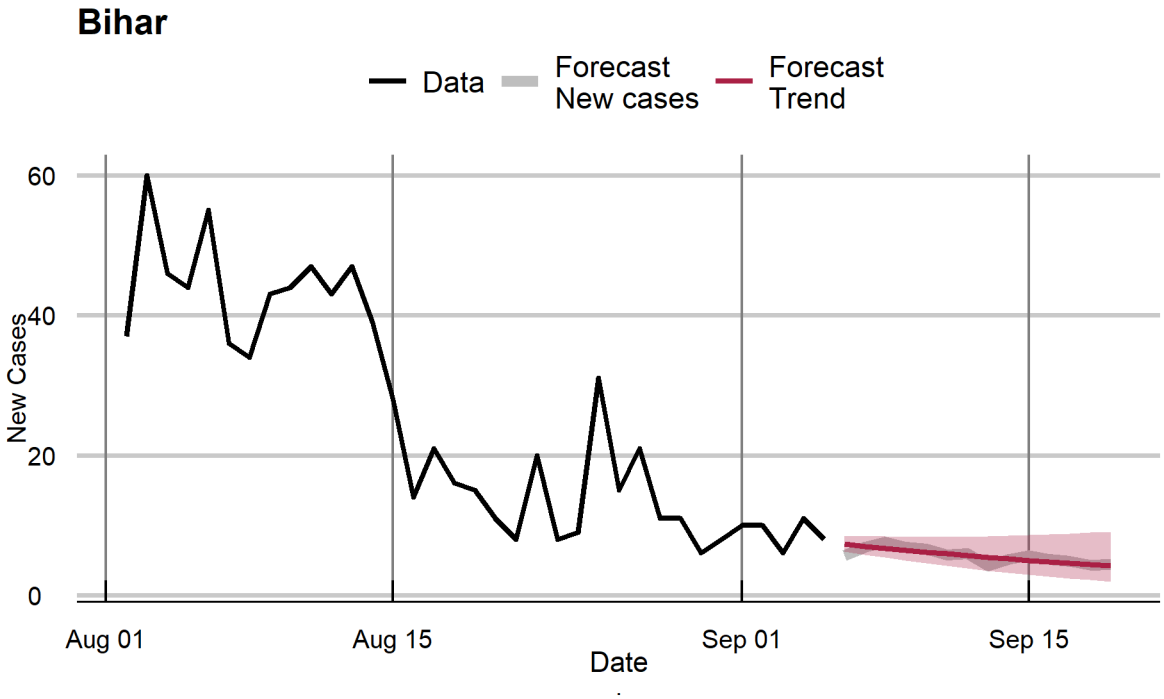


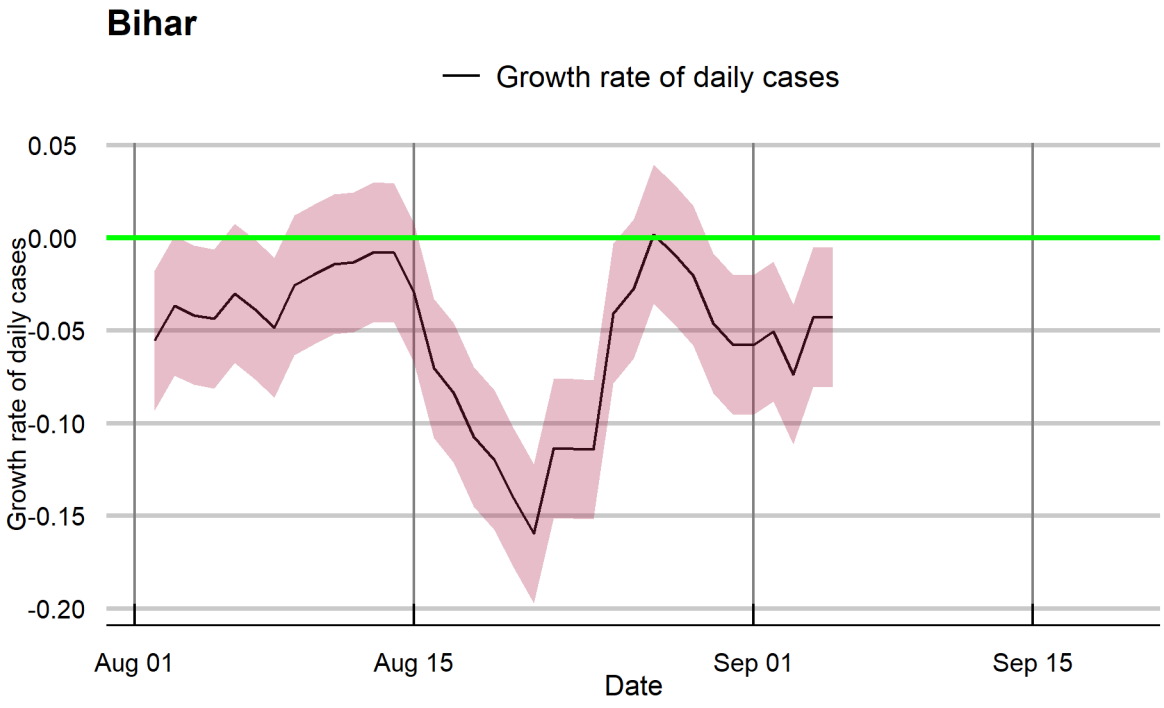

Arunachal Pradesh
Data
Forecast
New cases
Forecast
Trend
300
200
100
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

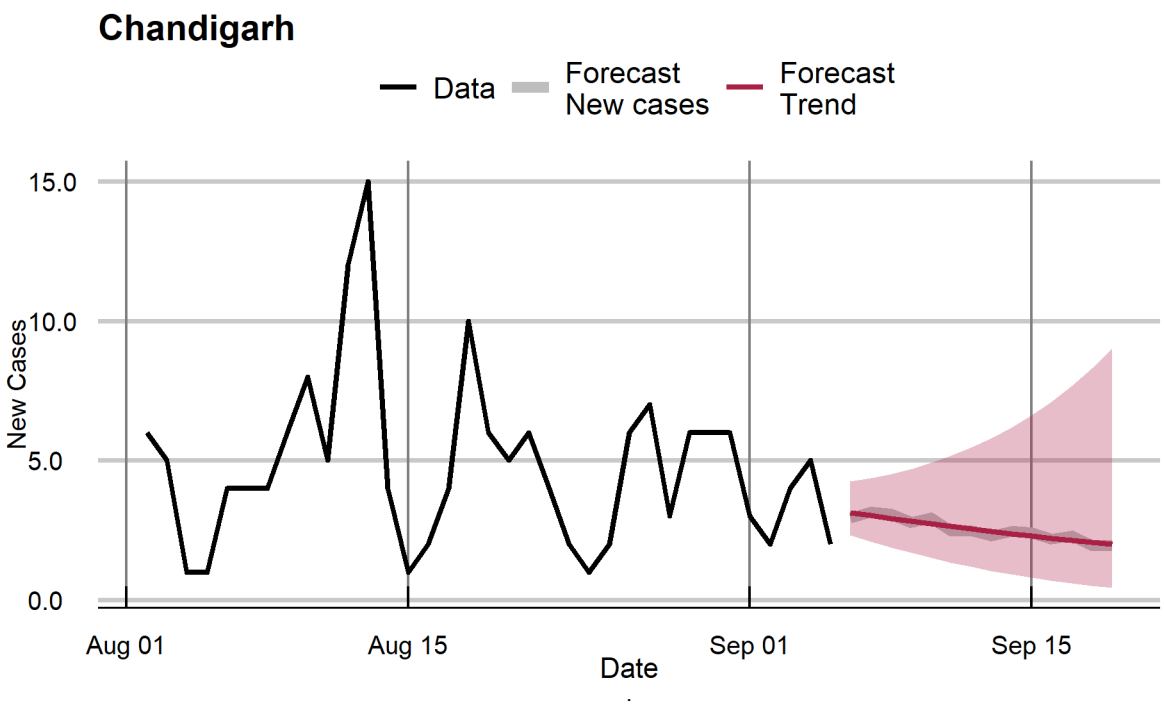

Arunachal Pradesh
Growth rate of daily cases
0.00
-0.05
-0.10
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

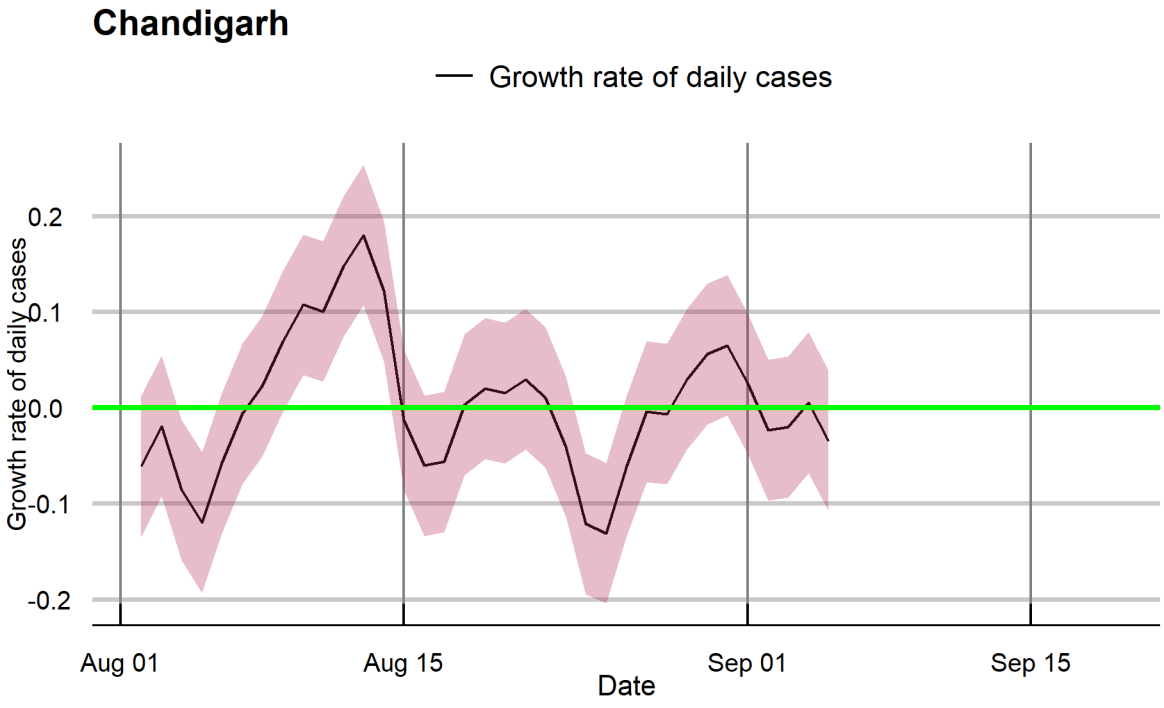

Assam
Data
Forecast
New cases
Forecast
Trend
1,250
1,000
750
500
250
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

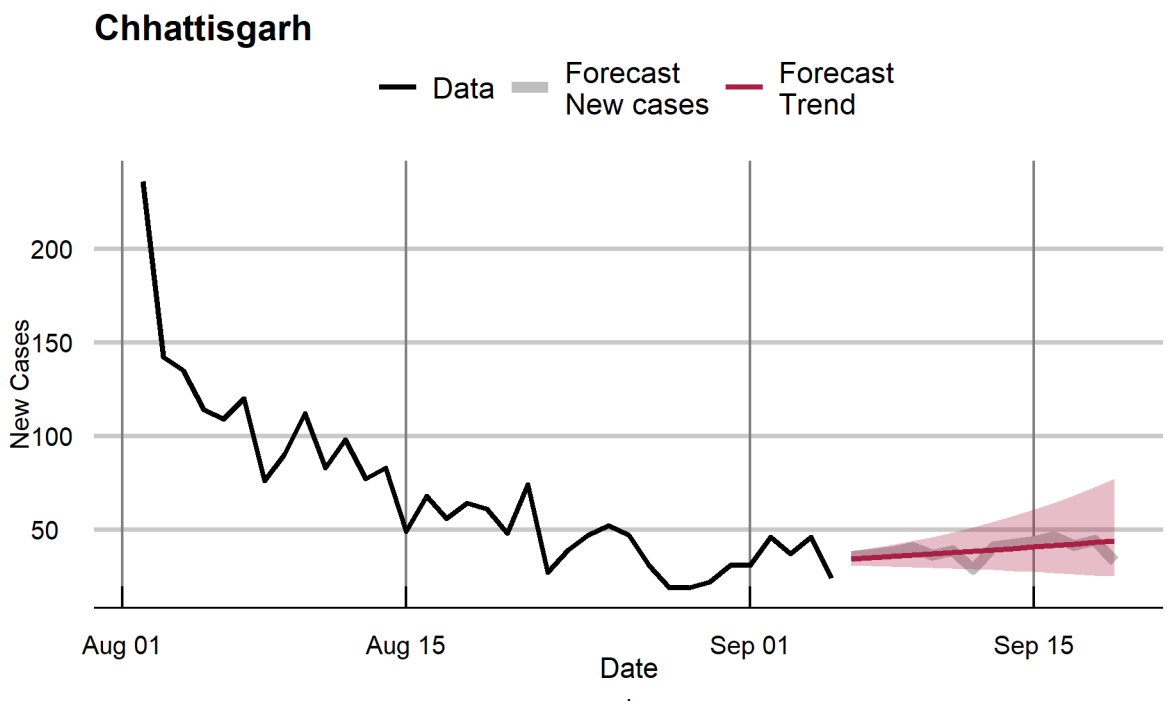

Assam
Growth rate of daily cases
0.025
0.000
-0.025
-0.050
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

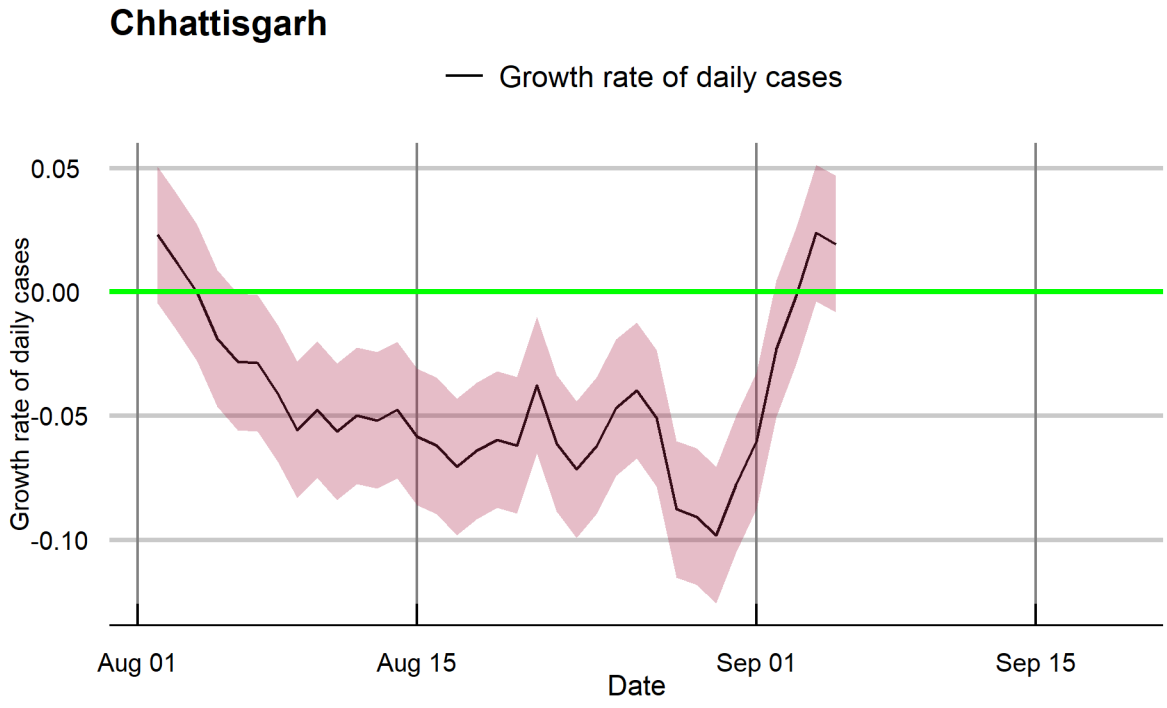

Bihar
Data
Forecast
New cases
Forecast
Trend
60
40
20
0
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

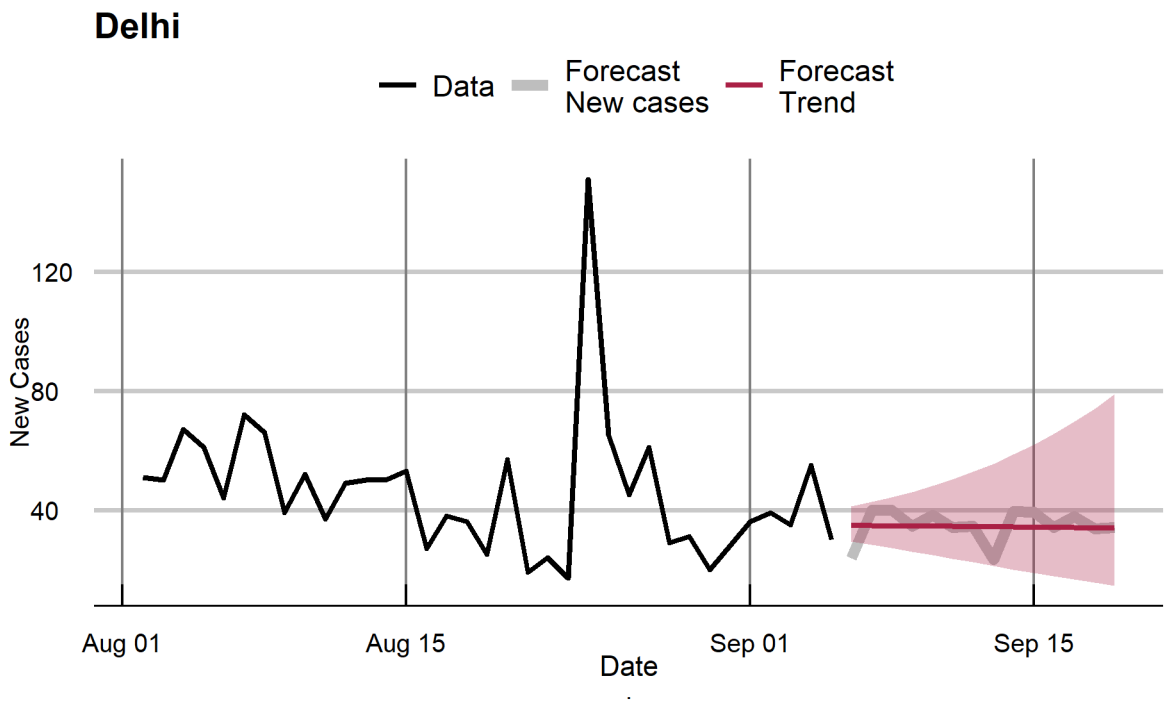

Bihar
Growth rate of daily cases
0.05
0.00
-0.05
-0.10
-0.15
-0.20
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

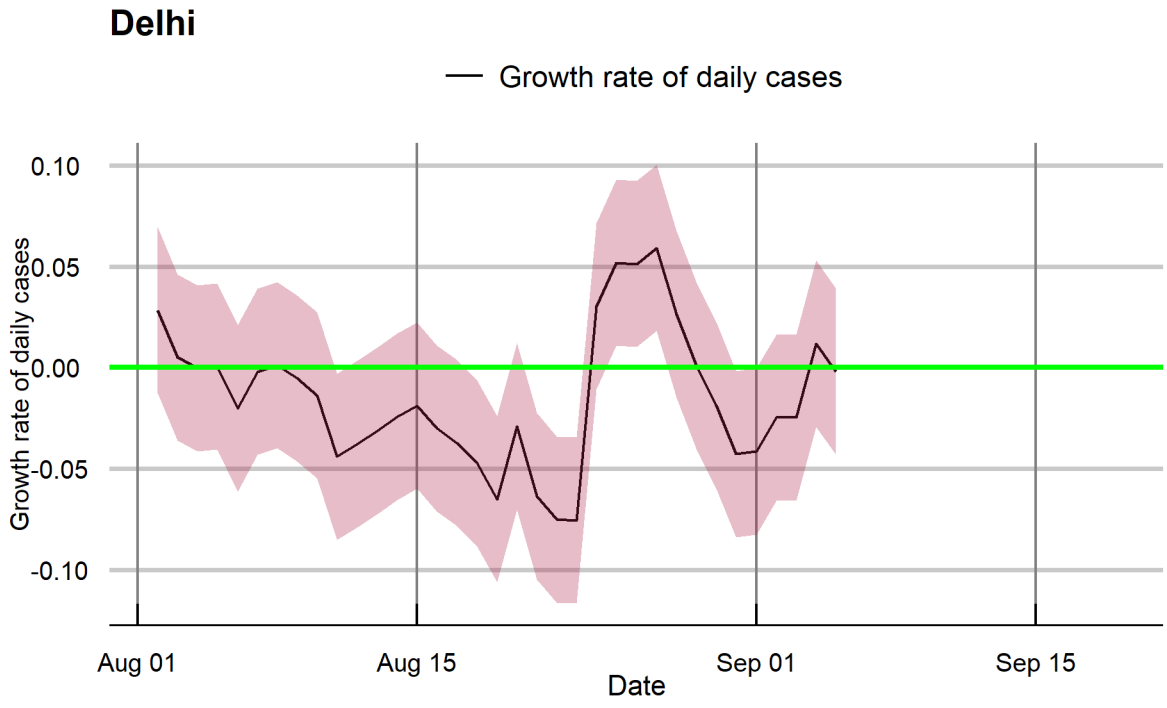

Chandigarh
Data
Forecast
New cases
Forecast
Trend
15.0
10.0
5.0
0.0
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

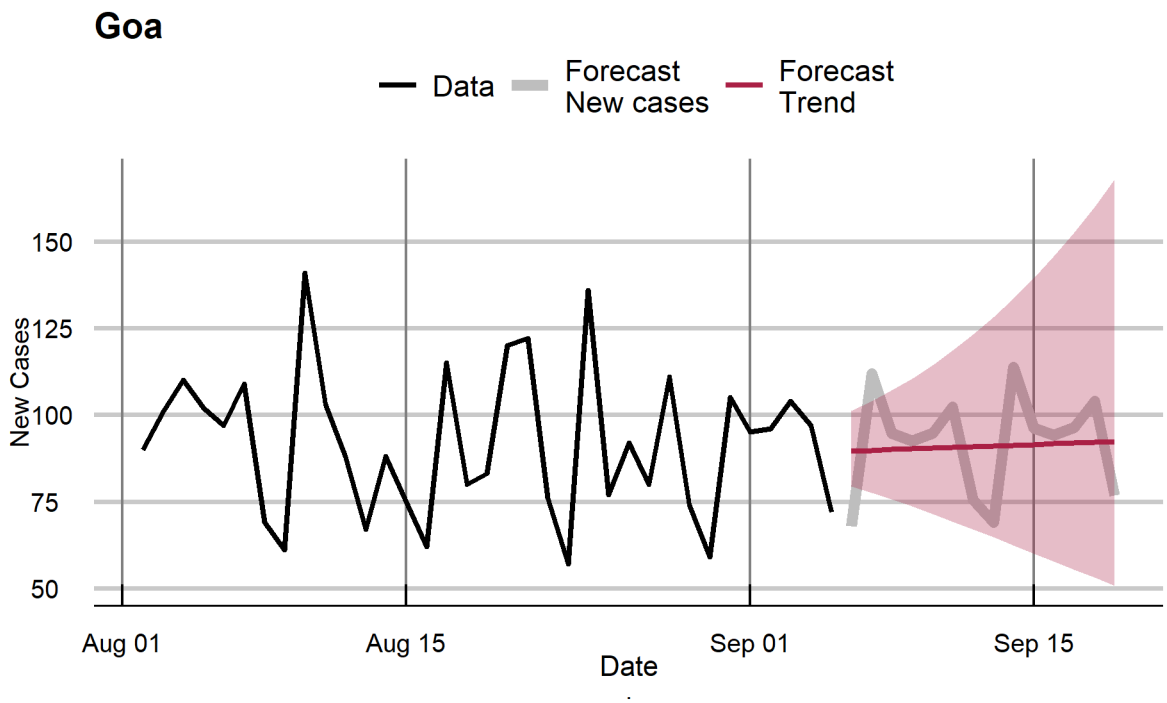

Chandigarh
Growth rate of daily cases
0.2
0.1
0.0
-0.1
-0.2
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

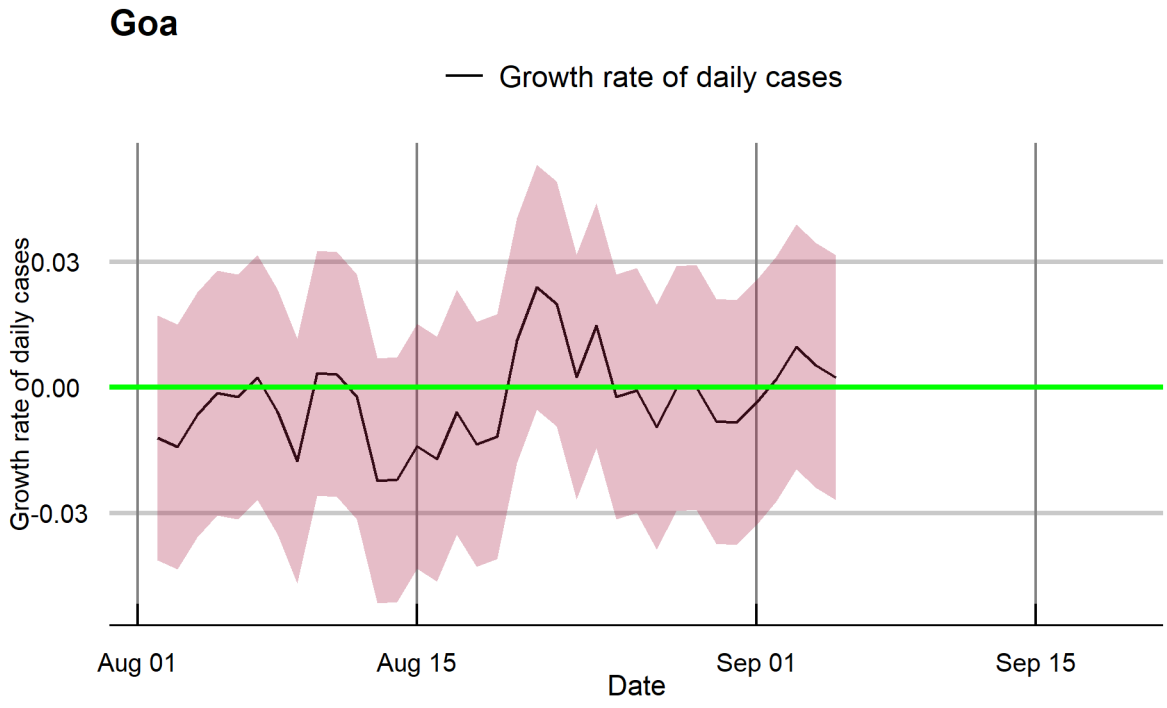

Chhattisgarh
Data
Forecast
New cases
Forecast
Trend
200
150
100
50
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

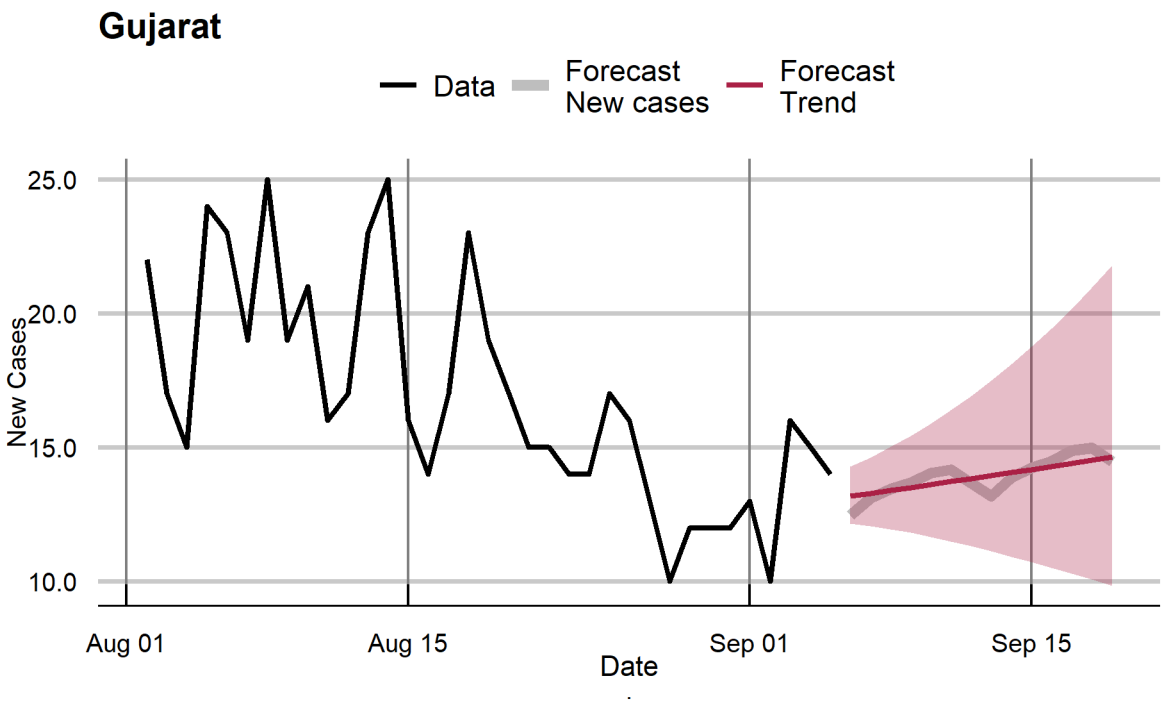

Chhattisgarh
Growth rate of daily cases
0.05
0.00
-0.05
-0.10
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

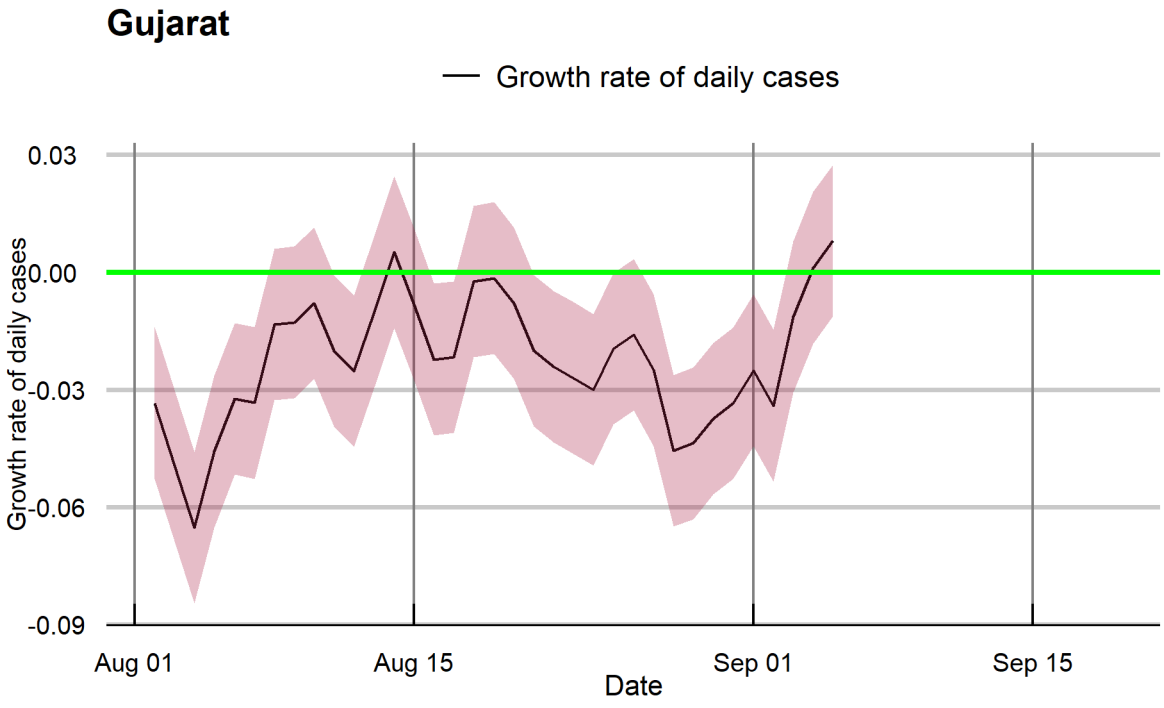

Delhi
Data
Forecast
New cases
Forecast
Trend
120
80
40
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

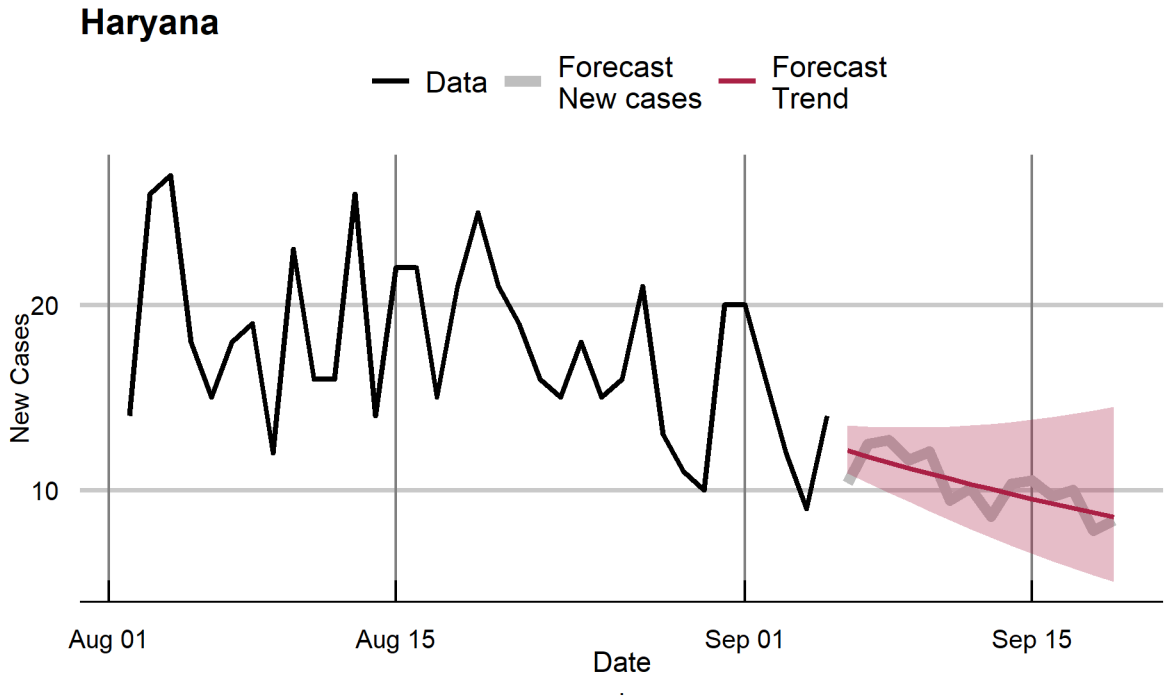

Delhi
Growth rate of daily cases
0.10
0.05
0.00
-0.05
-0.10
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

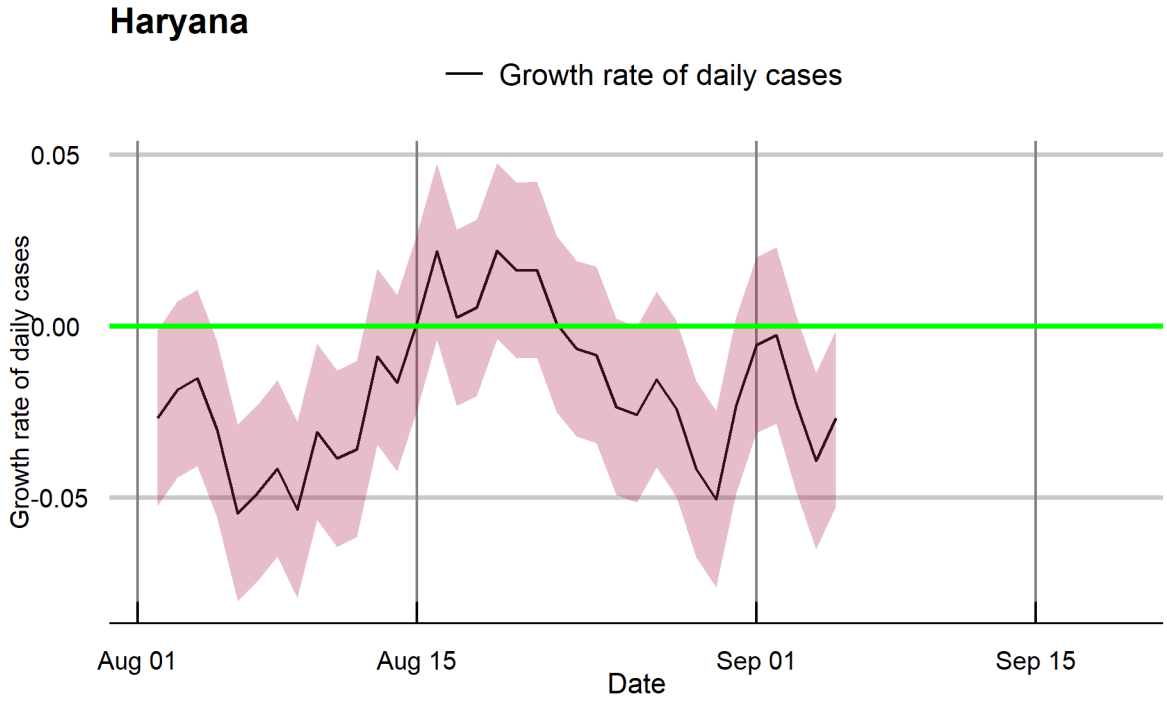

Goa
Data
Forecast
New cases
Forecast
Trend
150
125
100
75
50
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

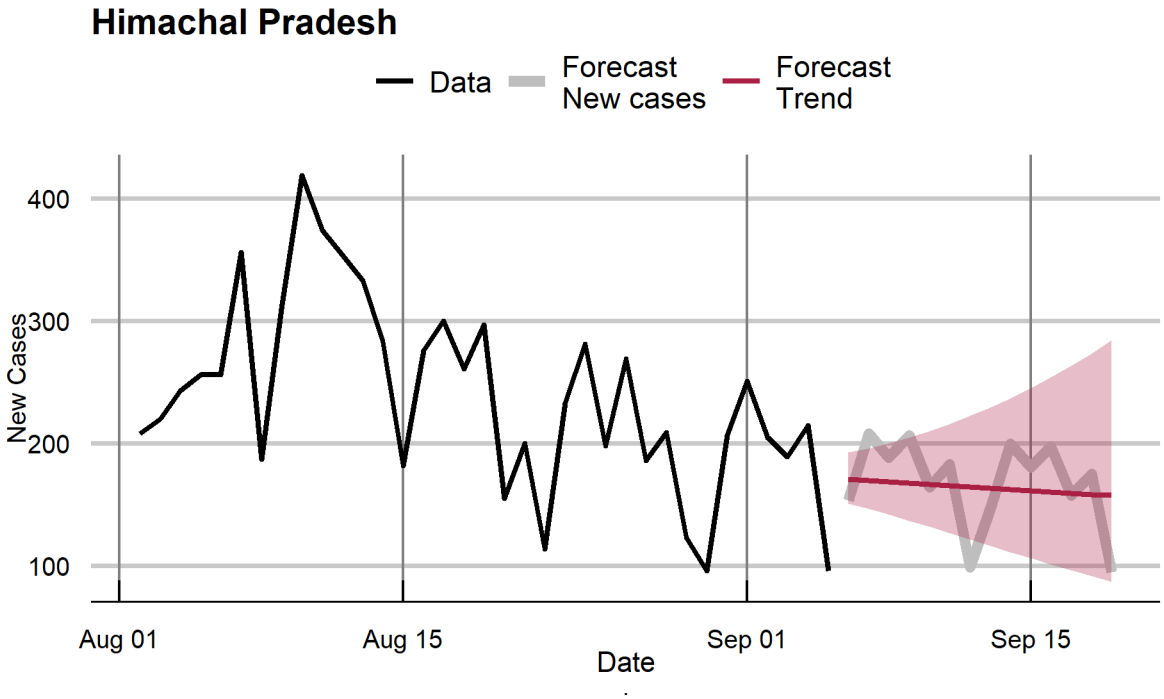

Goa
Growth rate of daily cases
0.03
0.00
-0.03
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

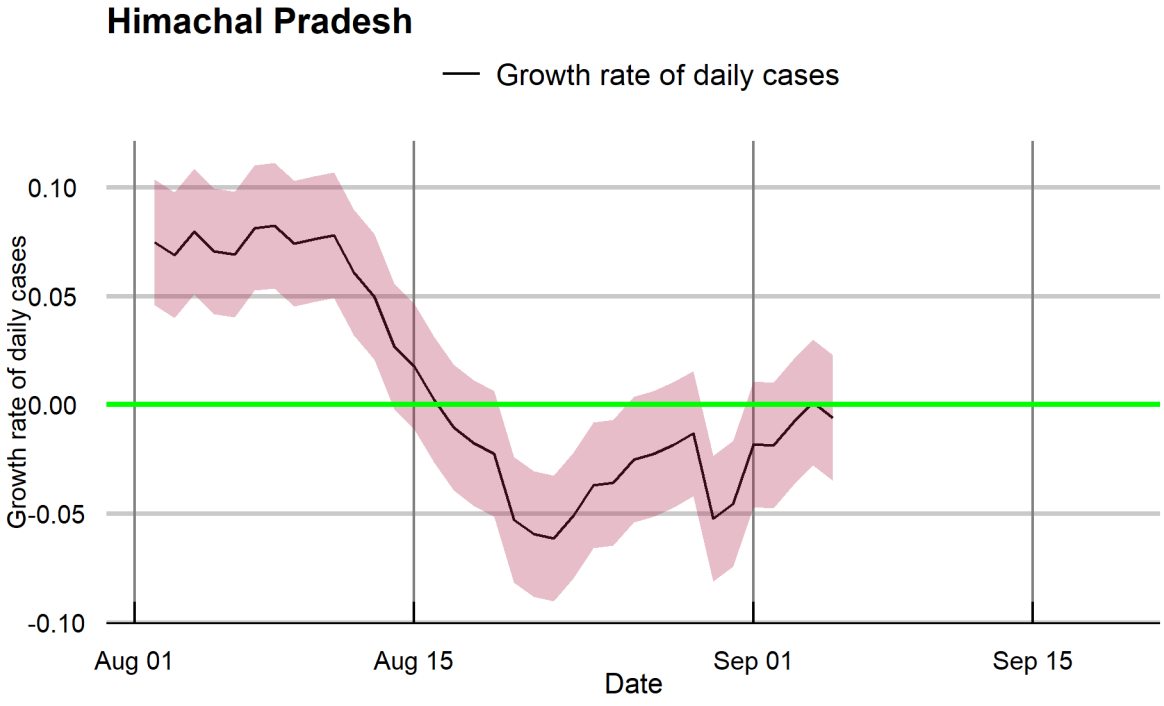

Gujarat
Data
Forecast
New cases
Forecast
Trend
25.0
20.0
15.0
10.0
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

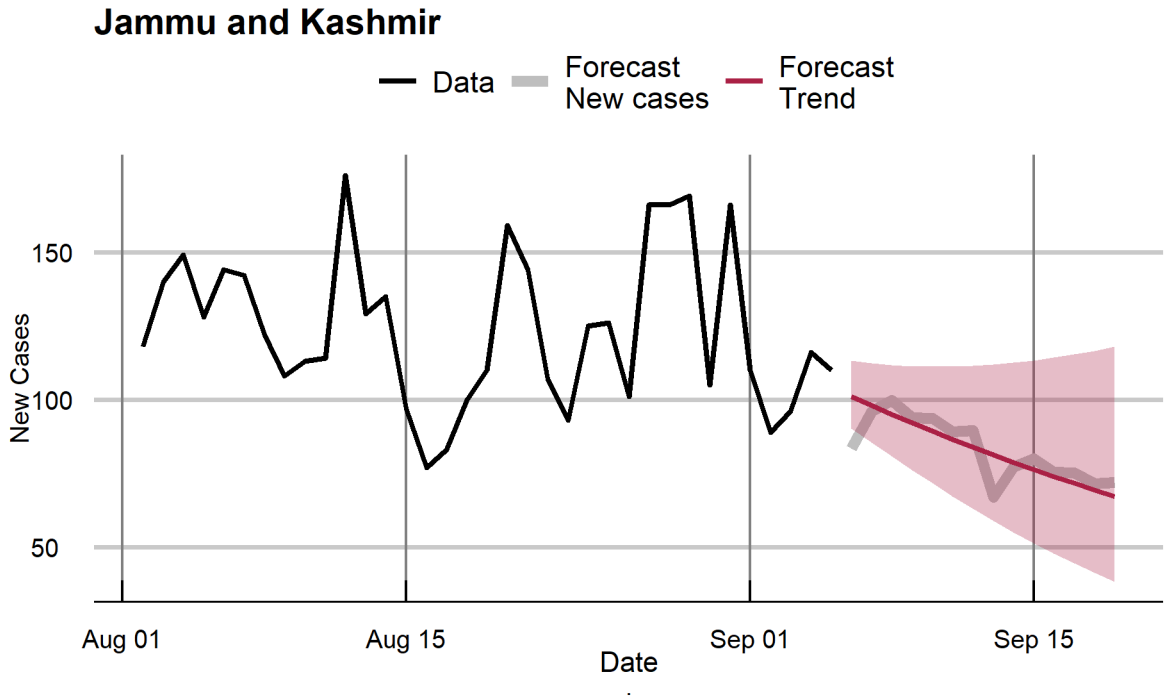

Gujarat
Growth rate of daily cases
0.03
0.00
-0.03
-0.06
-0.09
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

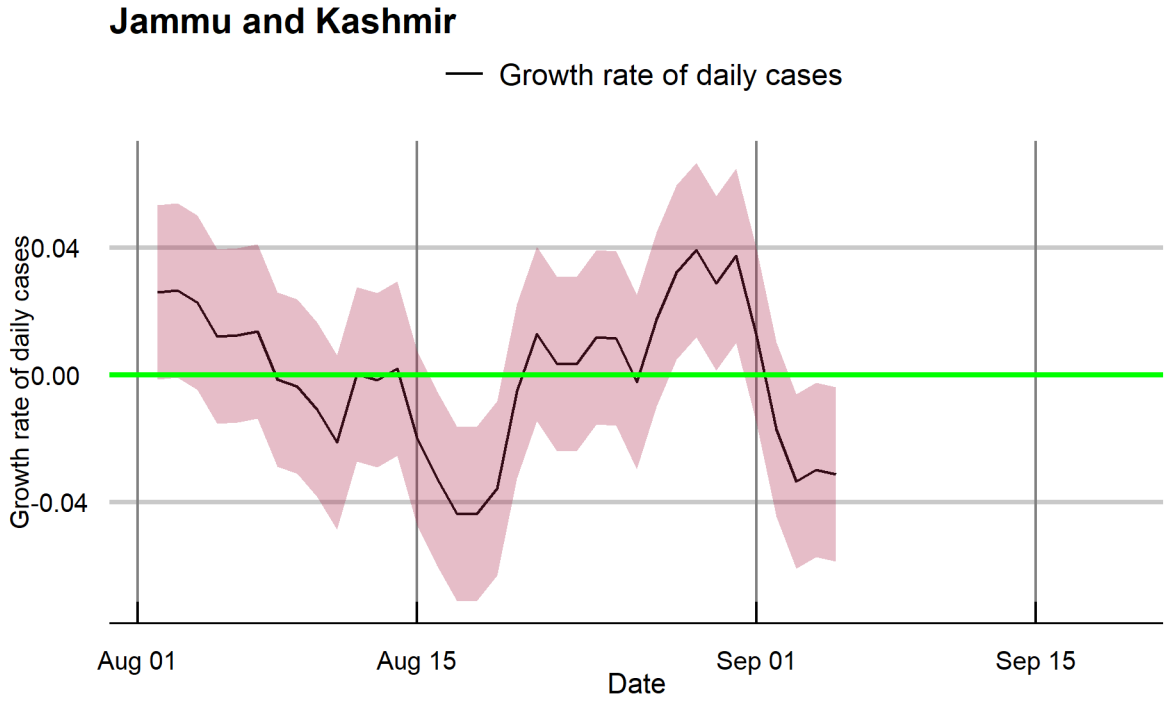

Haryana
Data
Forecast
New cases
Forecast
Trend
New Cases
20
10
Aug 01
Aug 15
Sep 01
Sep 15
Date

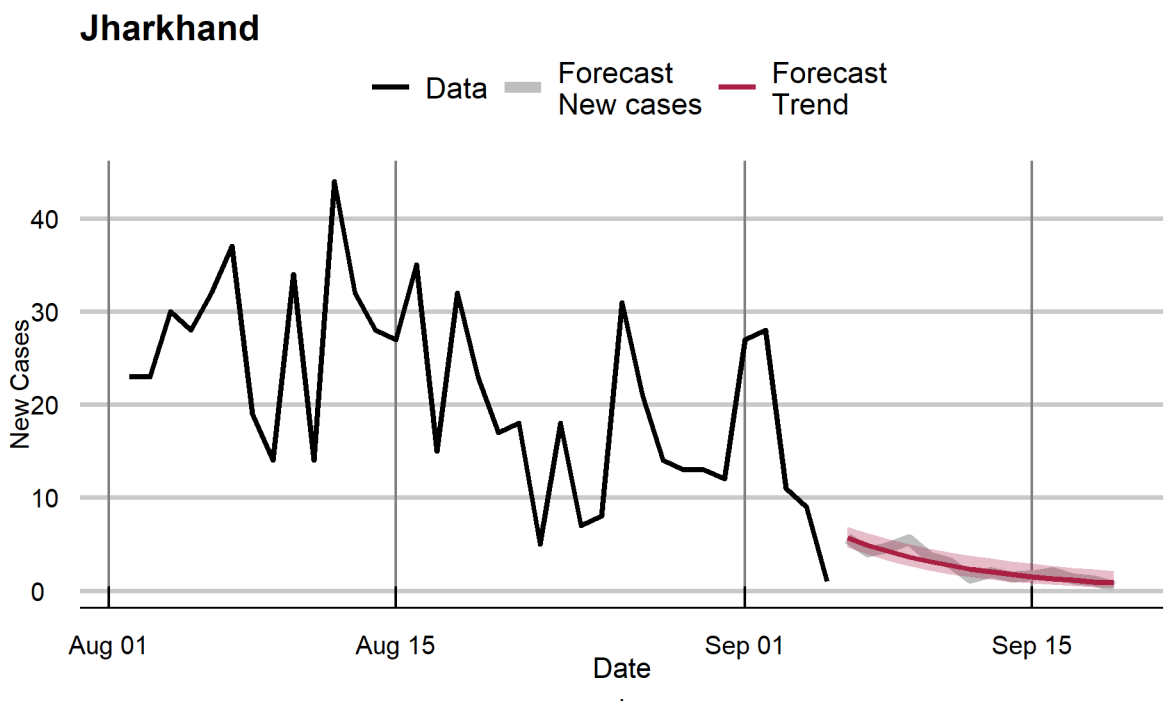

Haryana
Growth rate of daily cases
Growth rate of daily cases
0.05
0.00
-0.05
Aug 01
Aug 15
Sep 01
Sep 15
Date

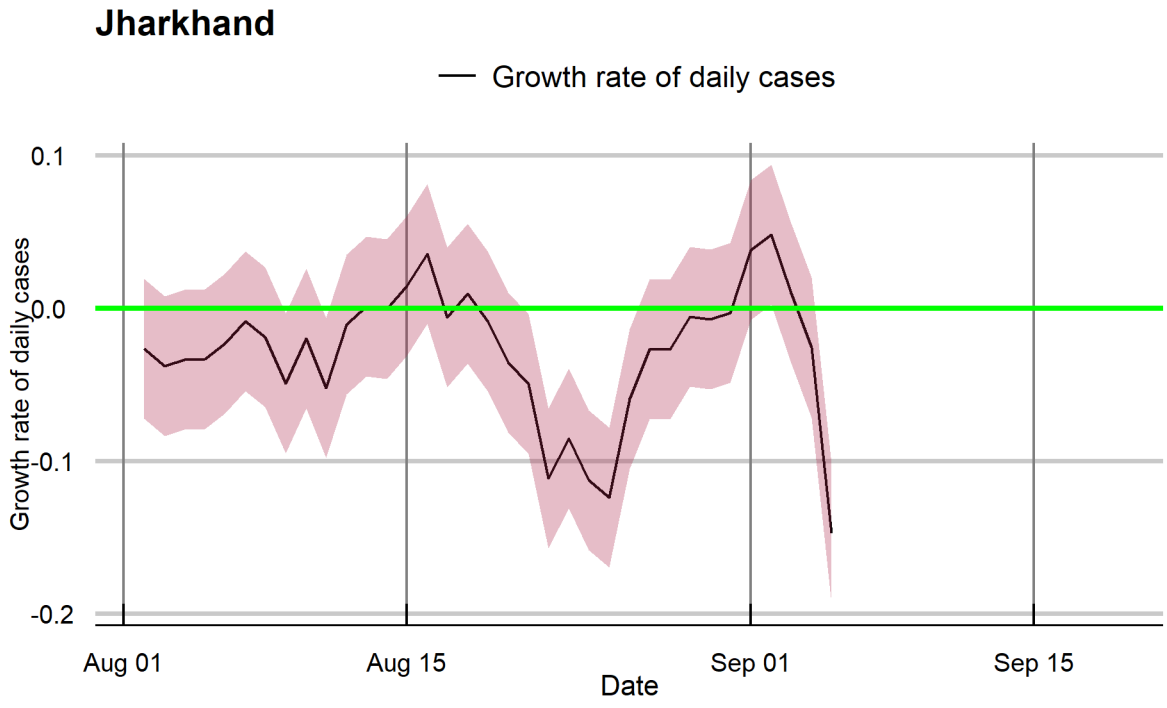

Himachal Pradesh
Data
Forecast
New cases
Forecast
Trend
400
300
200
100
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

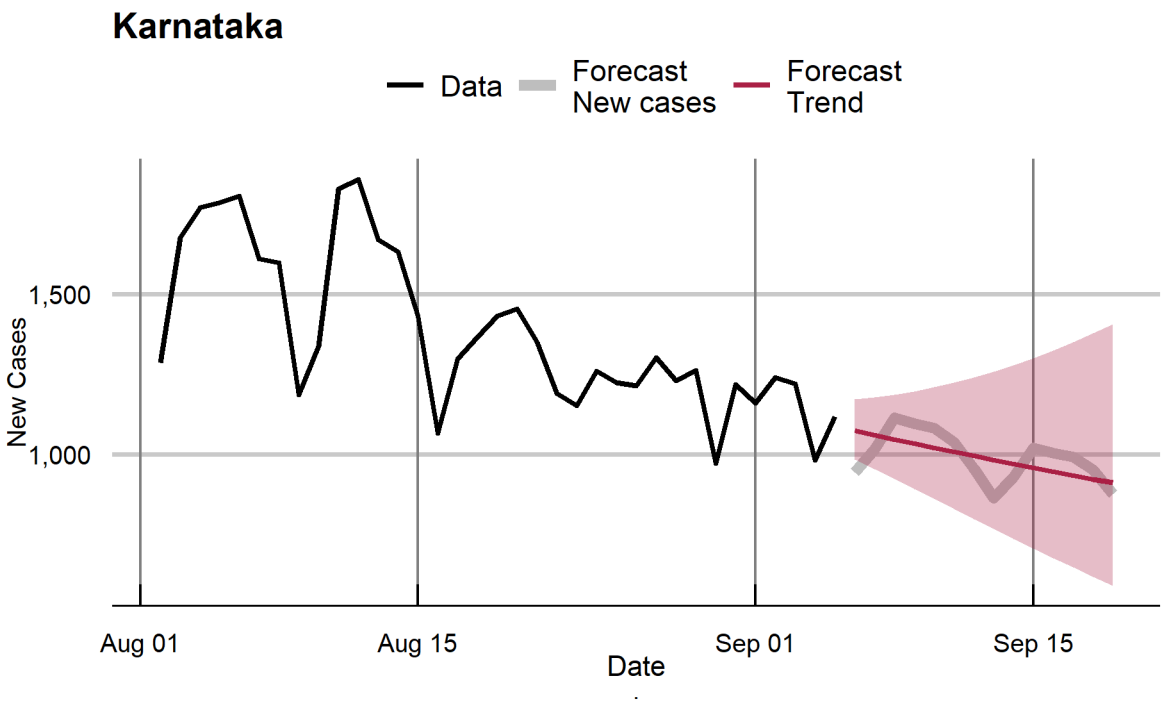

Himachal Pradesh
Growth rate of daily cases
0.10
0.05
0.00
-0.05
-0.10
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

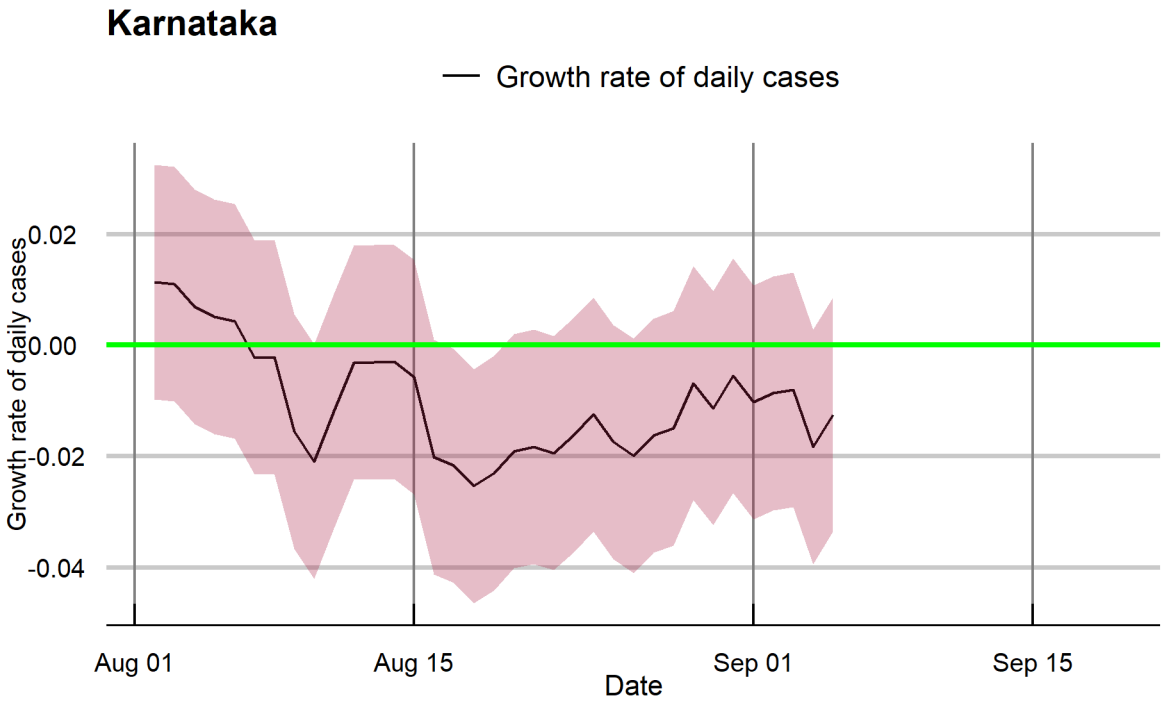

Jammu and Kashmir
Data
Forecast
New cases
Forecast
Trend
New Cases
150
100
50
Aug 01
Aug 15
Sep 01
Sep 15
Date

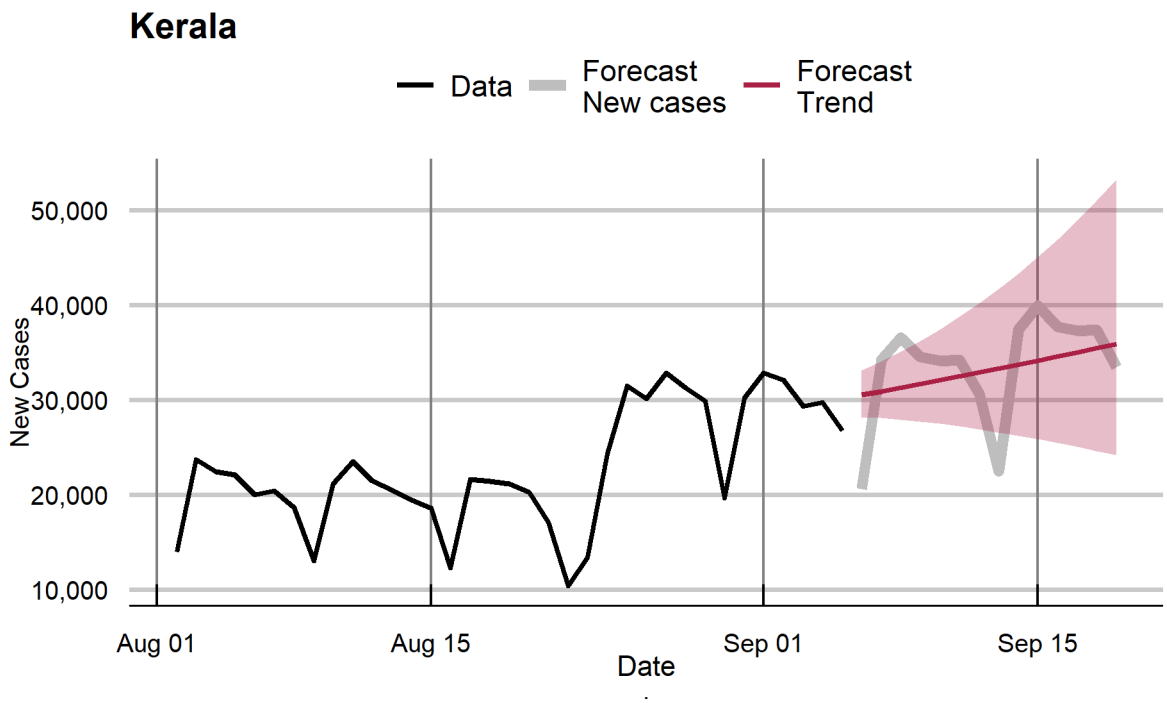

Jammu and Kashmir
Growth rate of daily cases
Growth rate of daily cases
0.04
0.00
-0.04
Aug 01
Aug 15
Sep 01
Sep 15
Date

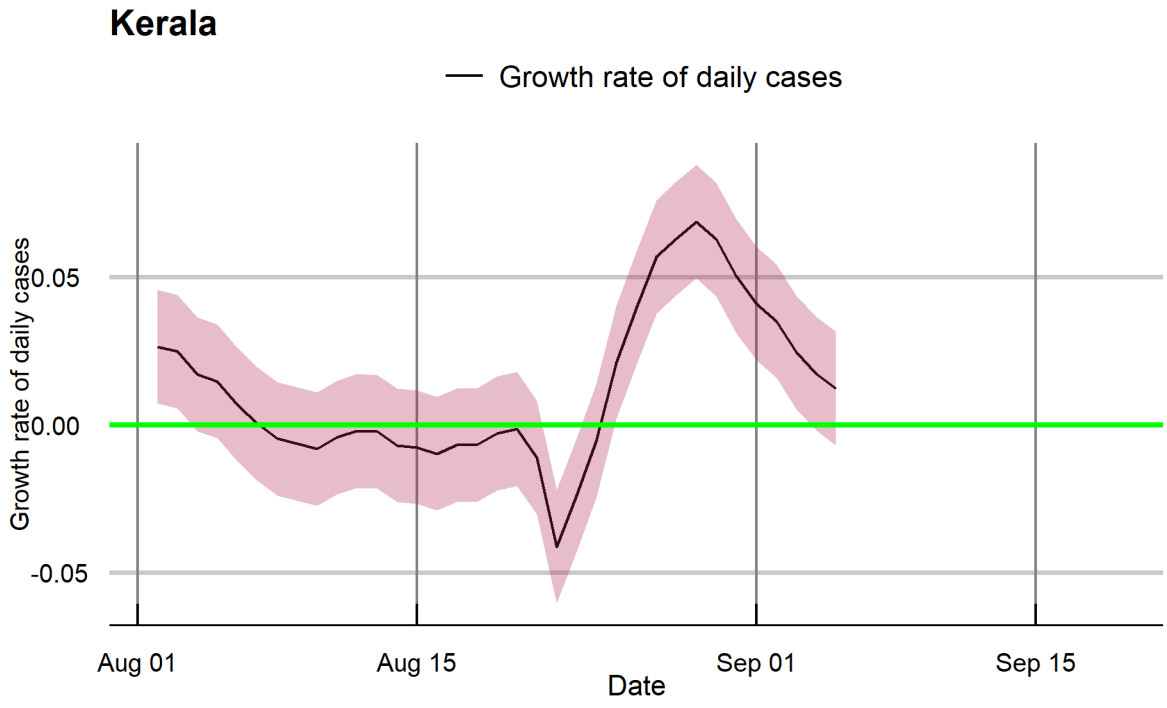

Jharkhand
Data
Forecast
New cases
Forecast
Trend
New Cases
40
30
20
10
0
Aug 01
Aug 15
Sep 01
Sep 15
Date

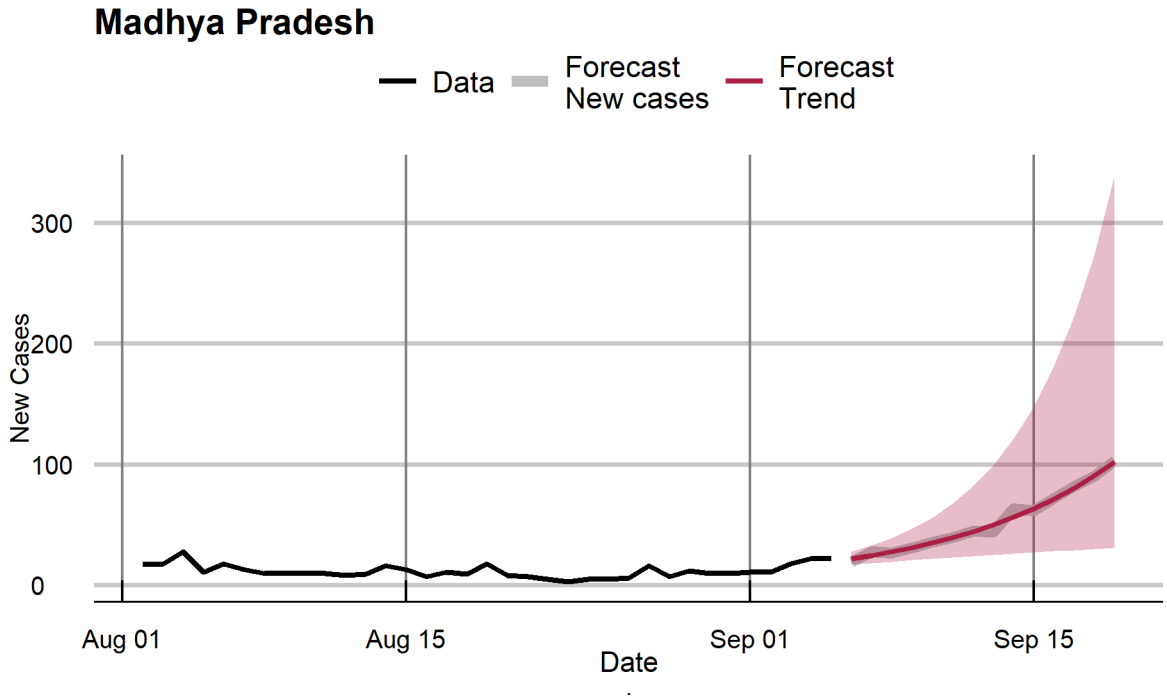

Jharkhand
Growth rate of daily cases
Growth rate of daily cases
0.1
0.0
-0.1
-0.2
Aug 01
Aug 15
Sep 01
Sep 15
Date

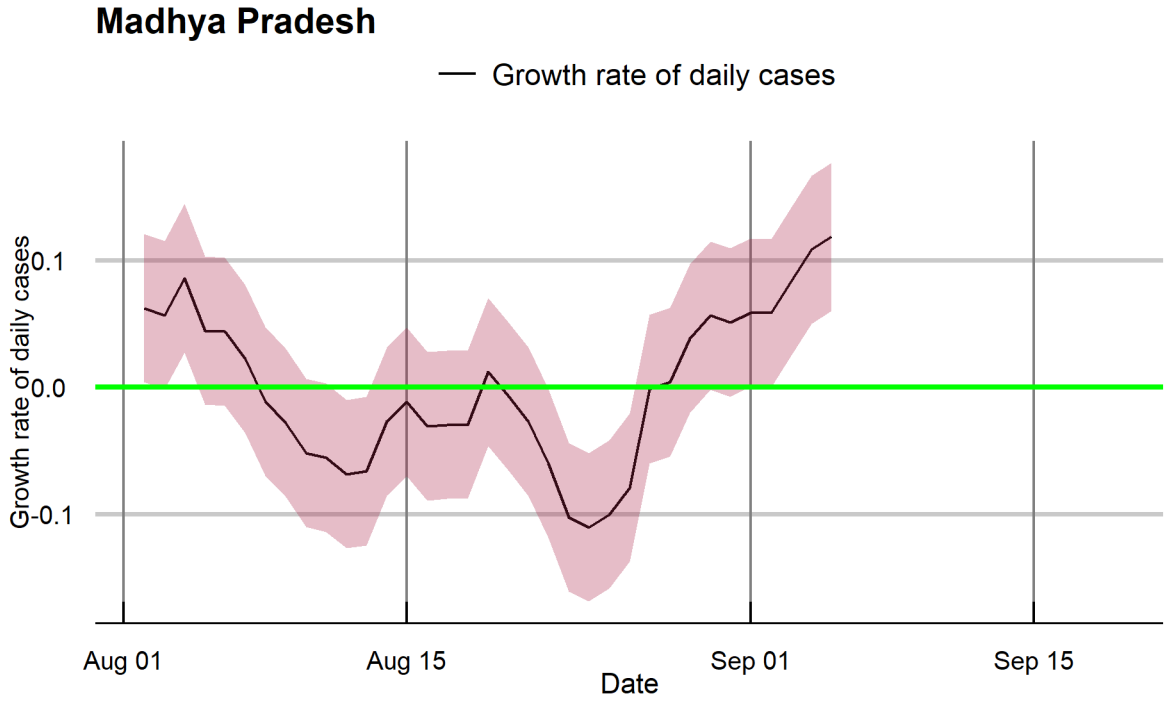

Karnataka
Data
Forecast
New cases
Forecast
Trend
New Cases
1,500
1,000
Aug 01
Aug 15
Sep 01
Sep 15
Date

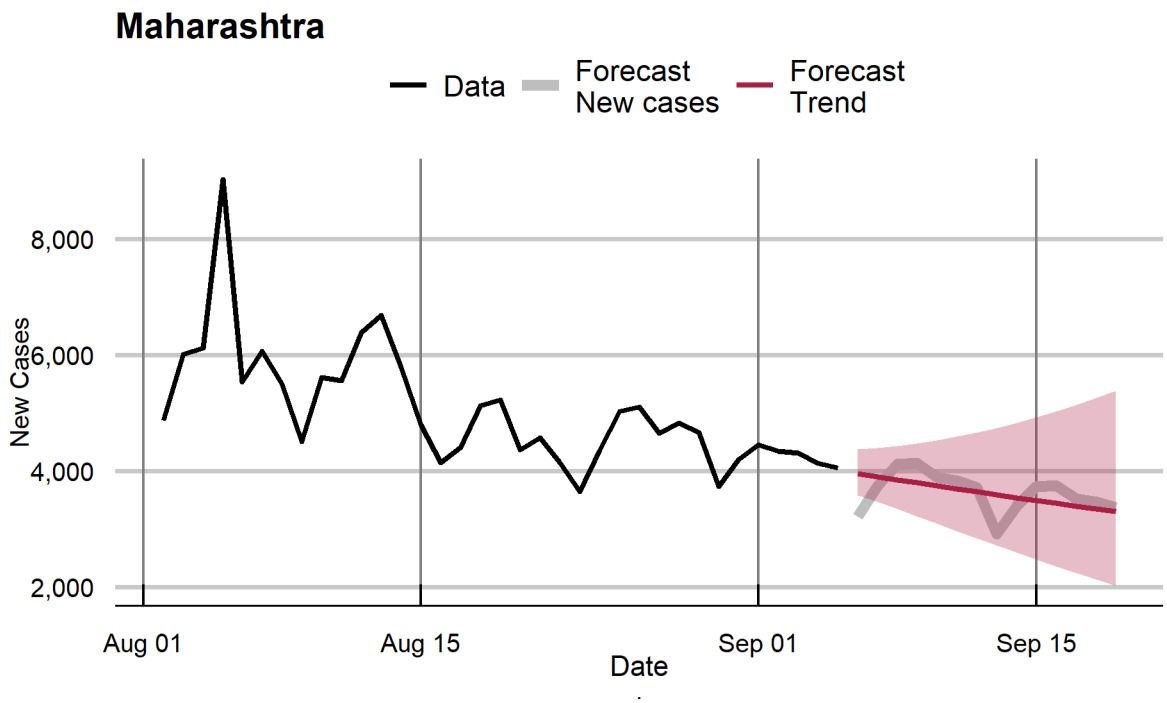

Karnataka
Growth rate of daily cases
Growth rate of daily cases
0.02
0.00
-0.02
-0.04
Aug 01
Aug 15
Sep 01
Sep 15
Date

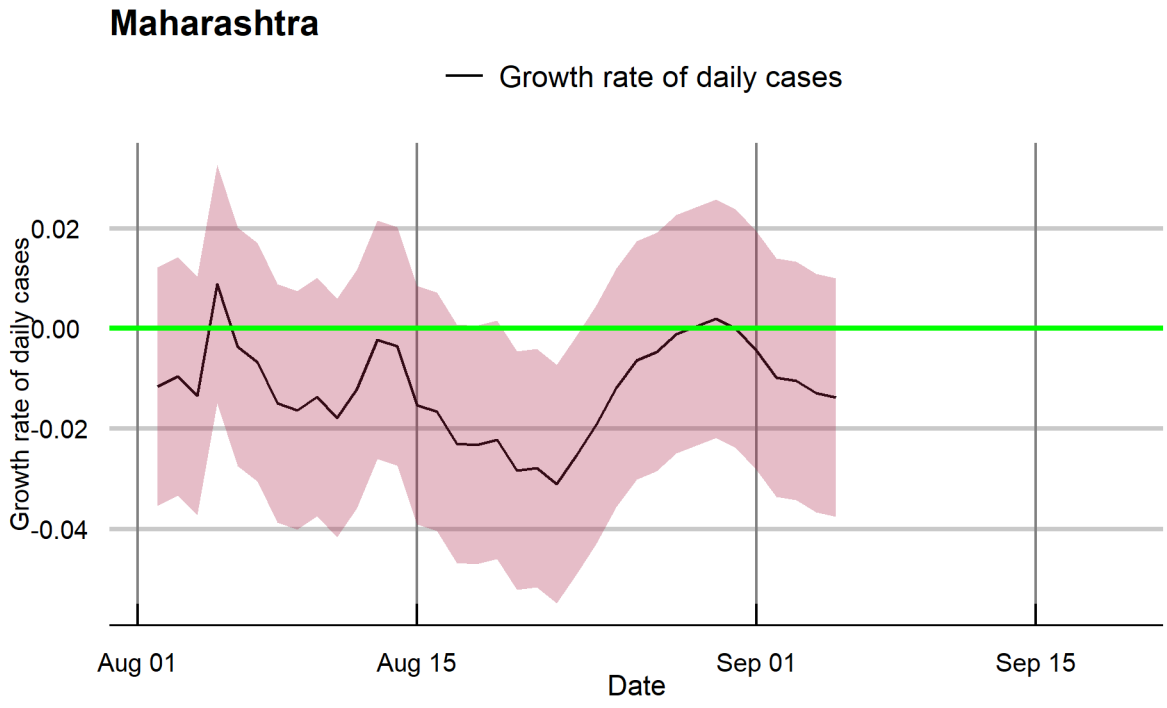

Kerala
Data
Forecast
New cases
Forecast
Trend
50,000
40,000
30,000
20,000
10,000
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

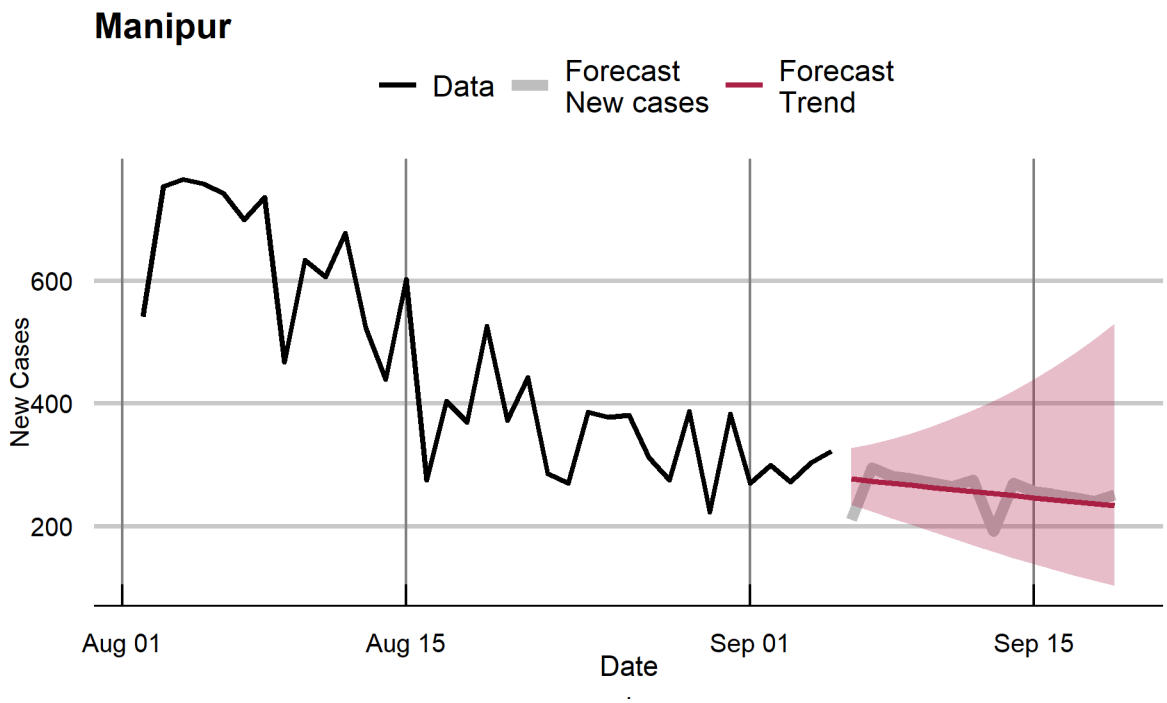

Kerala
Growth rate of daily cases
0.05
0.00
-0.05
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

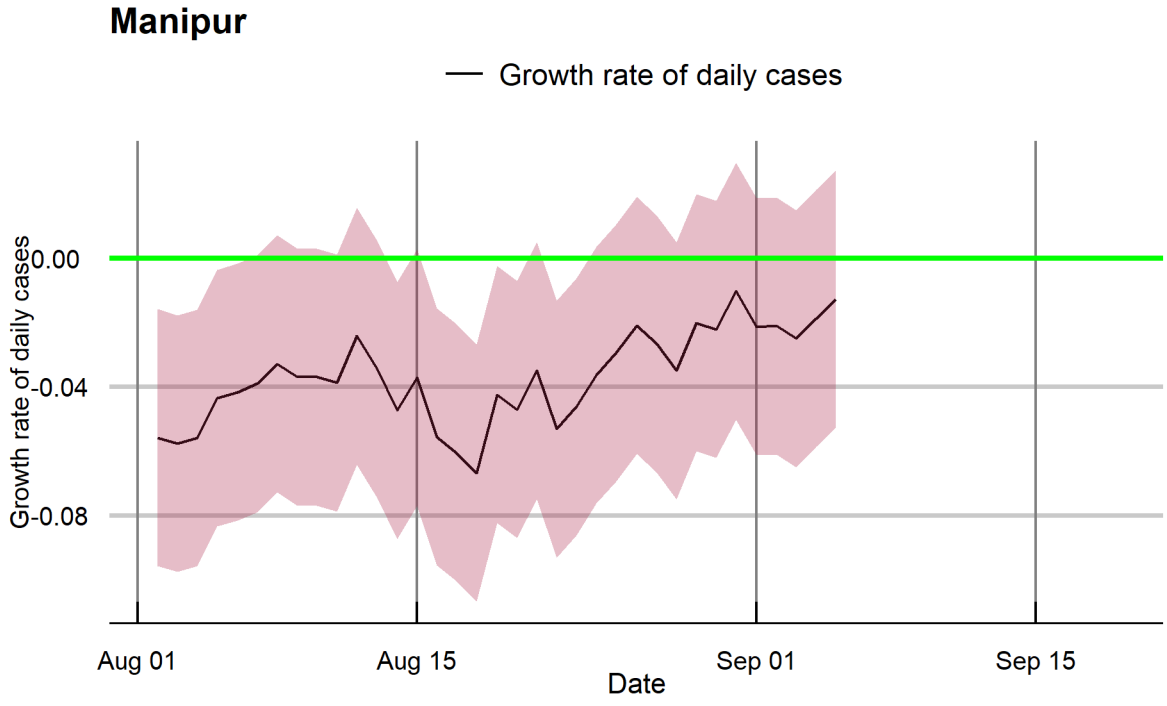

Madhya Pradesh
Data
Forecast
New cases
Forecast
Trend
300
200
100
0
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

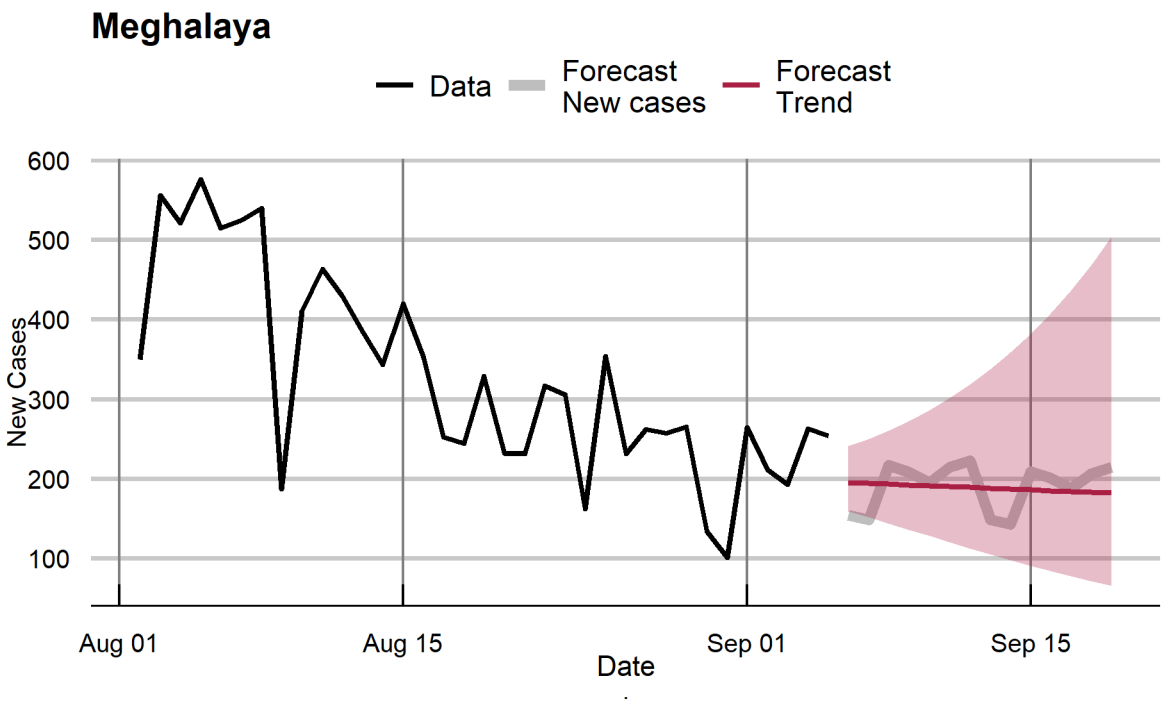

Madhya Pradesh
Growth rate of daily cases
0.1
0.0
-0.1
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

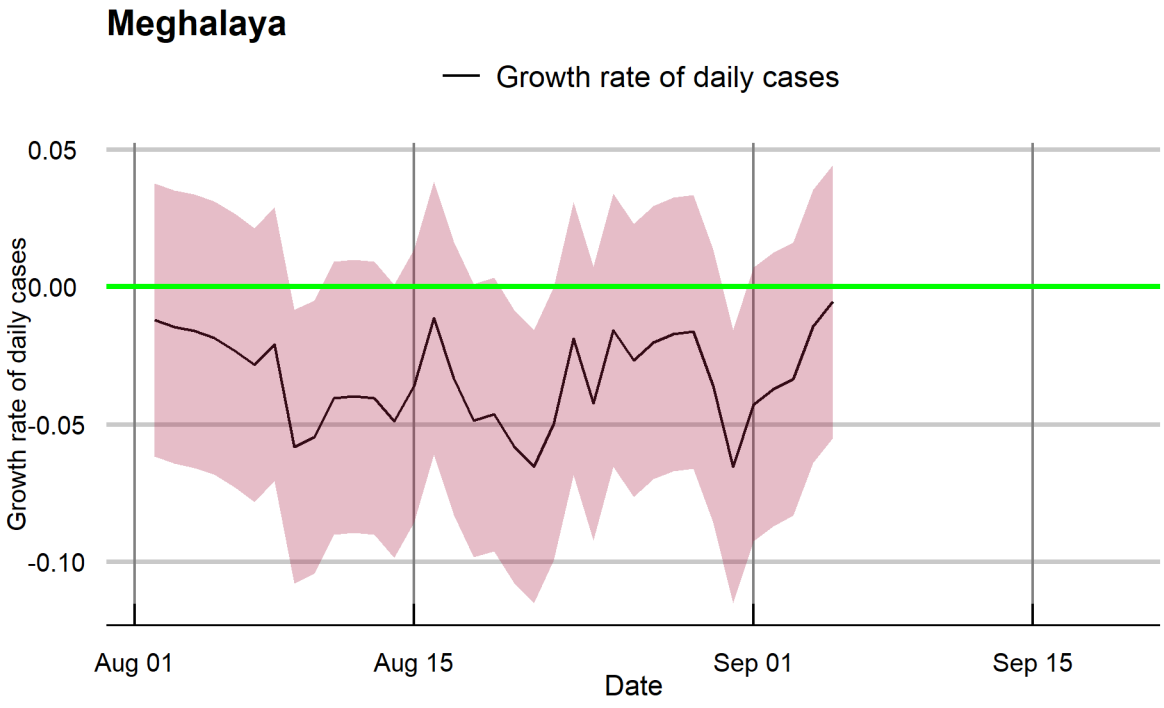

Maharashtra
Data
Forecast
New cases
Forecast
Trend
8,000
6,000
4,000
2,000
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date


Maharashtra
Growth rate of daily cases
0.02
0.00
-0.02
-0.04
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

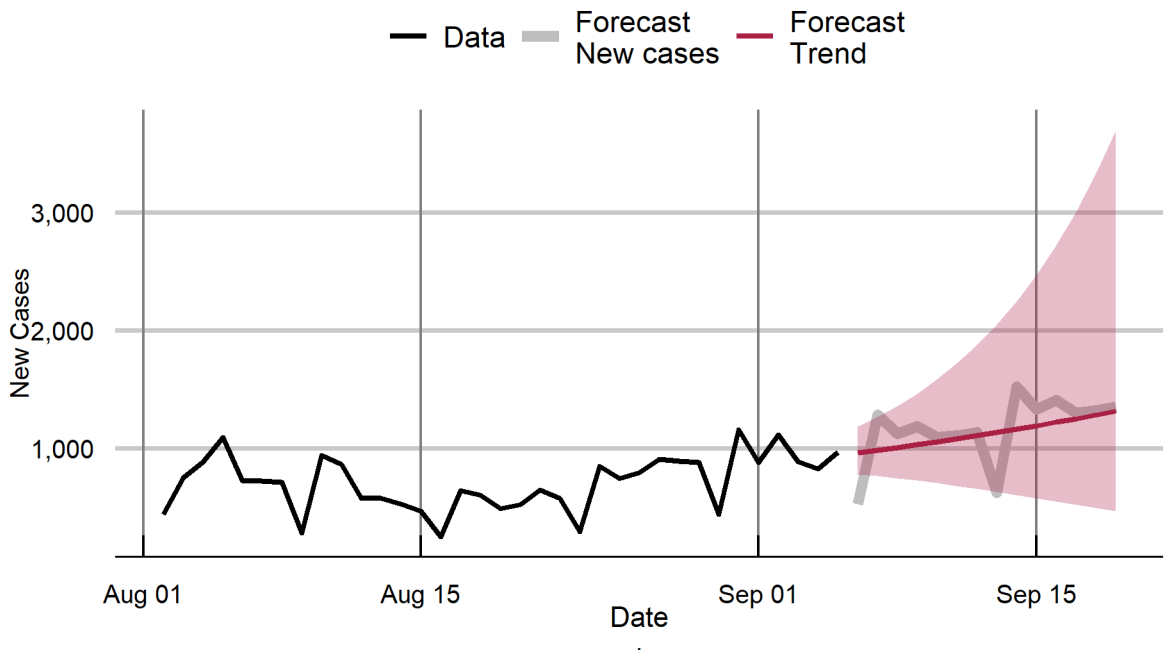

Manipur
Data
Forecast
New cases
Forecast
Trend
600
400
200
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date


Manipur
Growth rate of daily cases
0.00
-0.04
-0.08
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

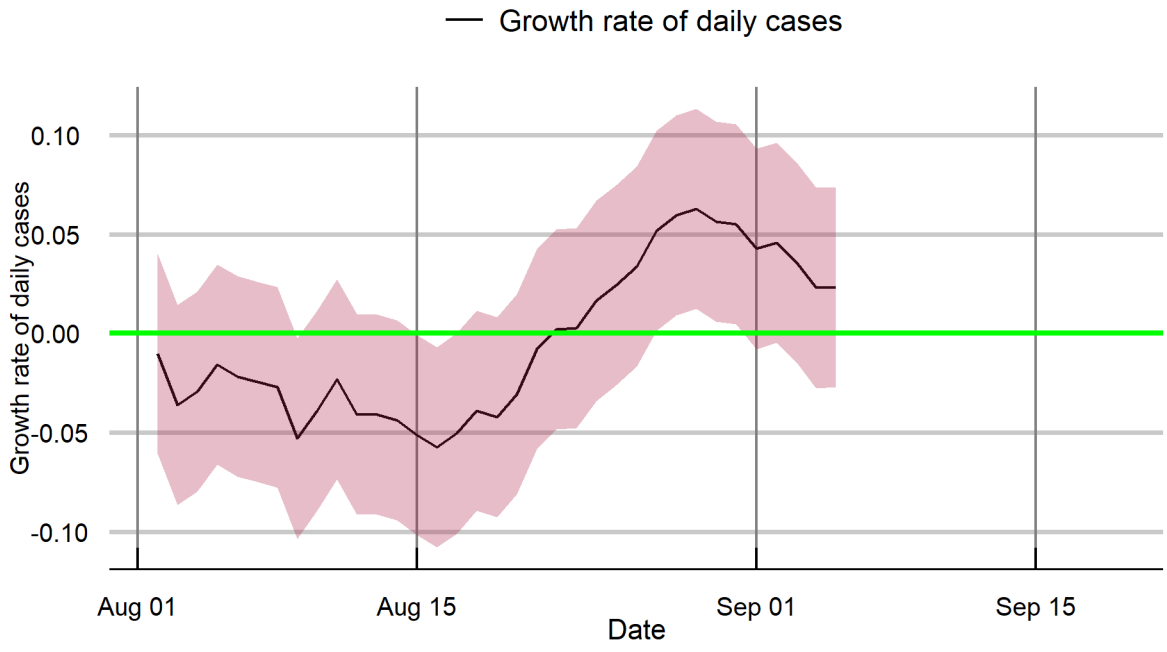

Meghalaya
Data
Forecast
New cases
Forecast
Trend
600
500
400
300
200
100
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

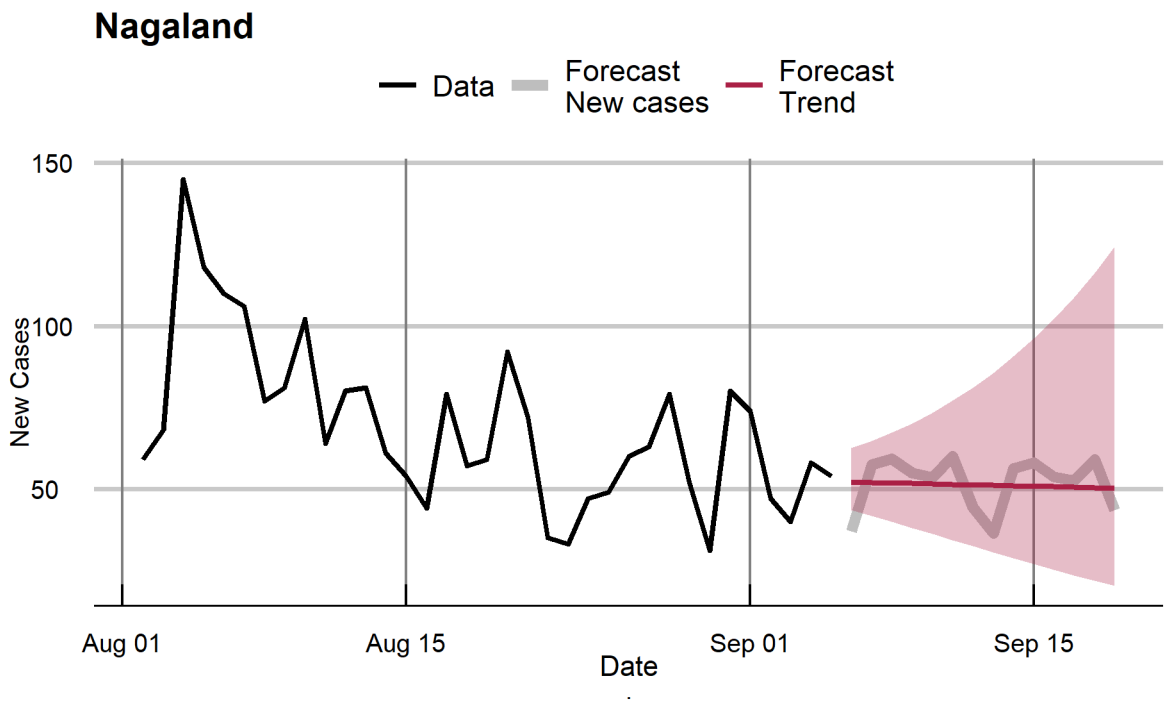

Meghalaya
Growth rate of daily cases
0.05
0.00
-0.05
-0.10
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

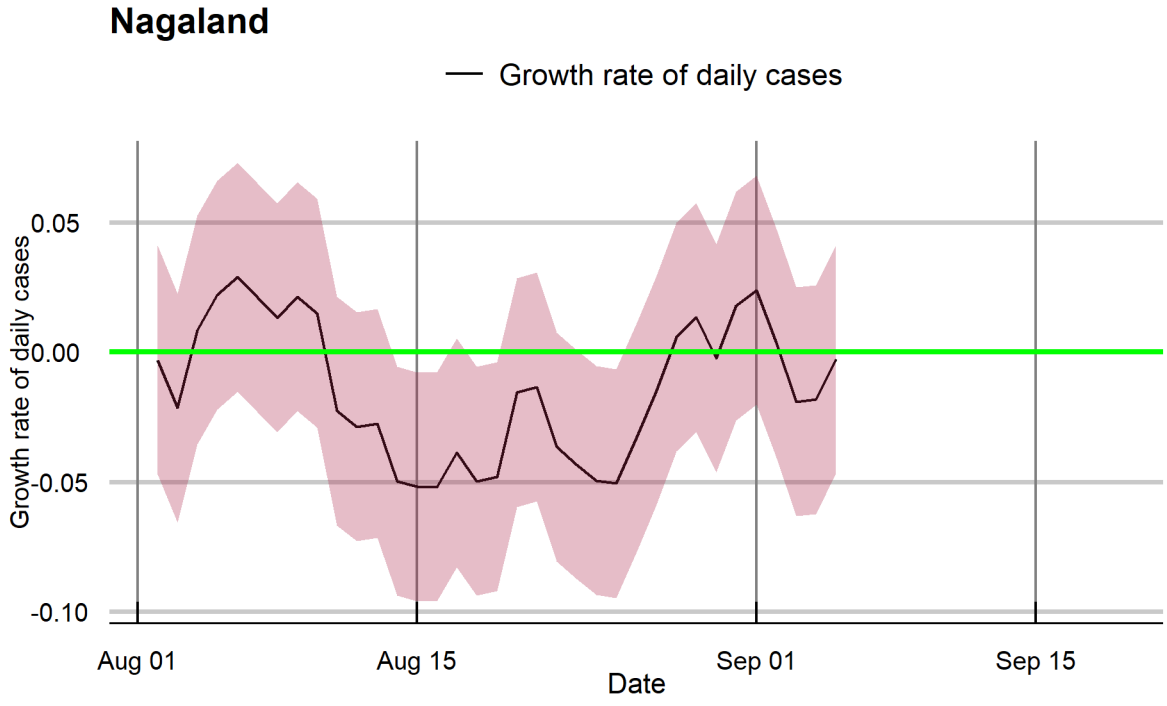
Mizoram

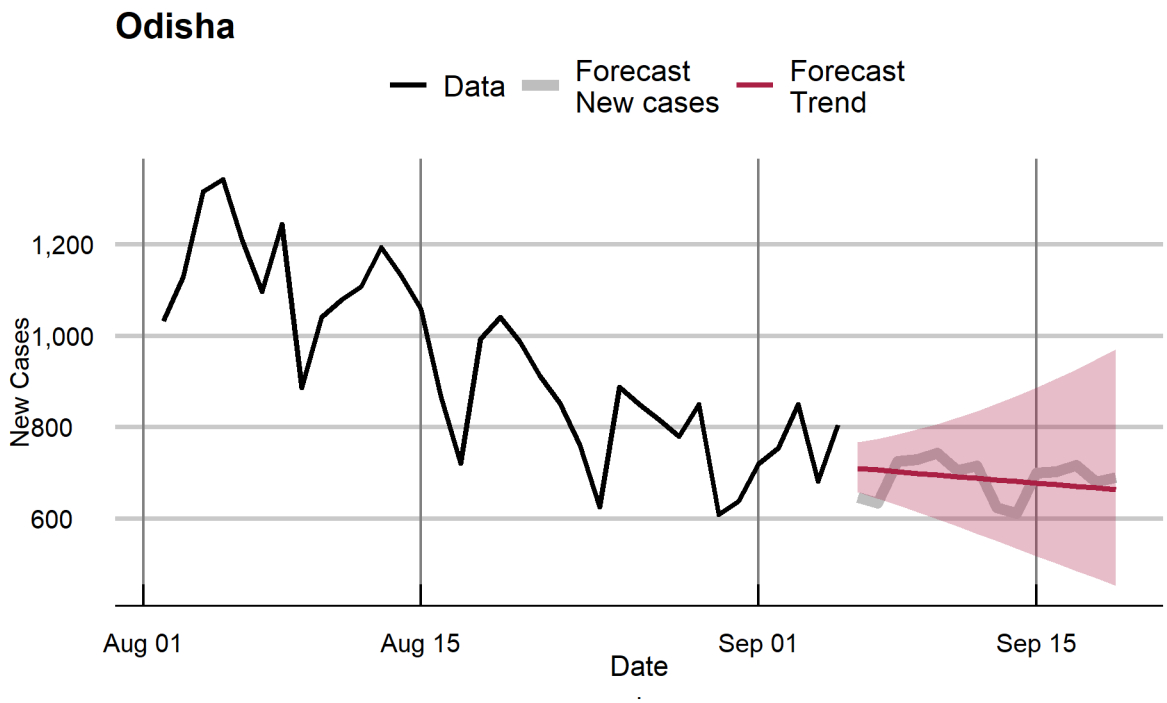


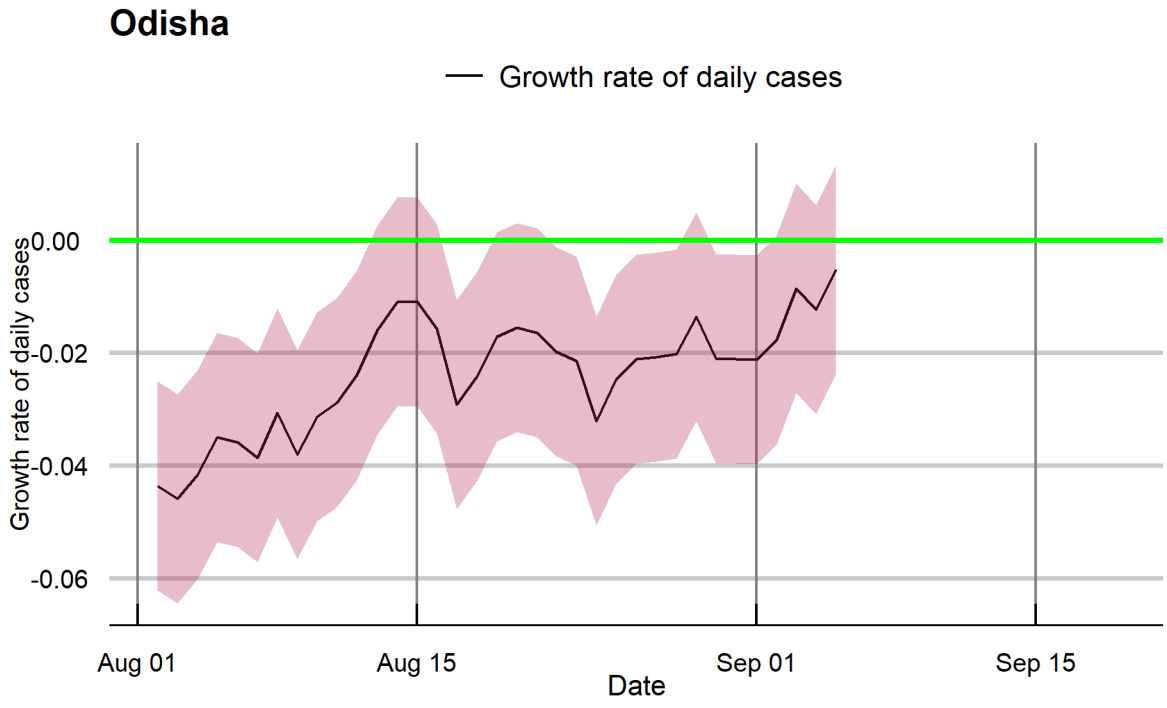
Mizoram

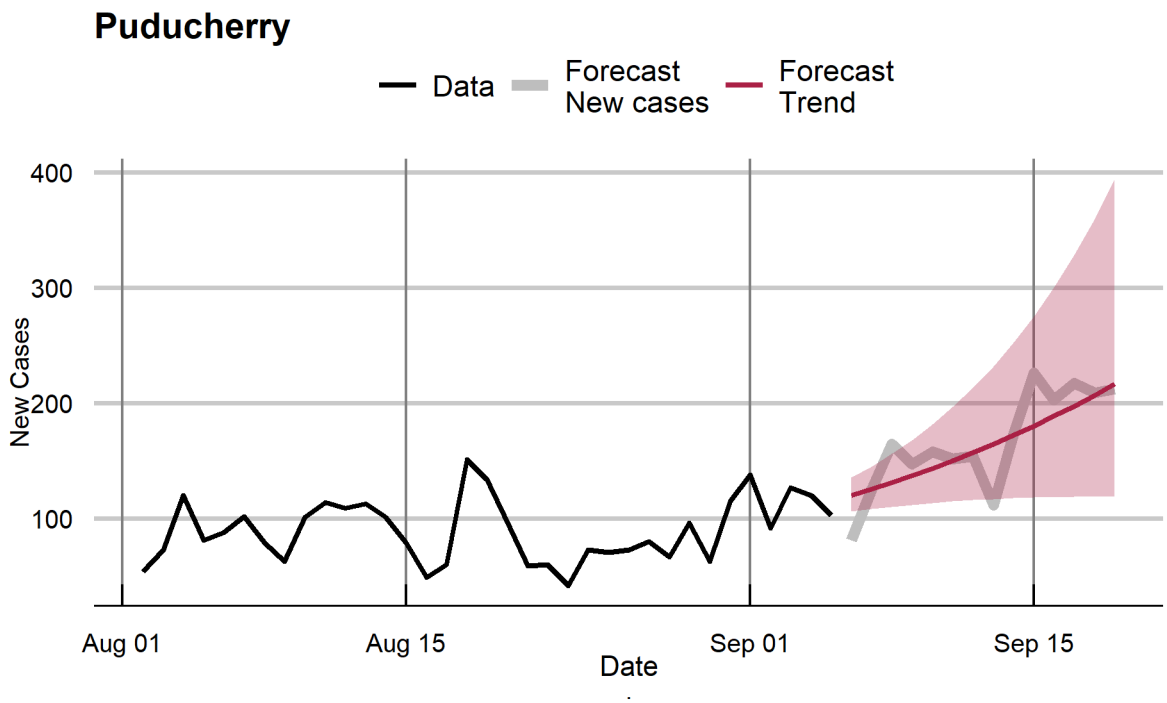


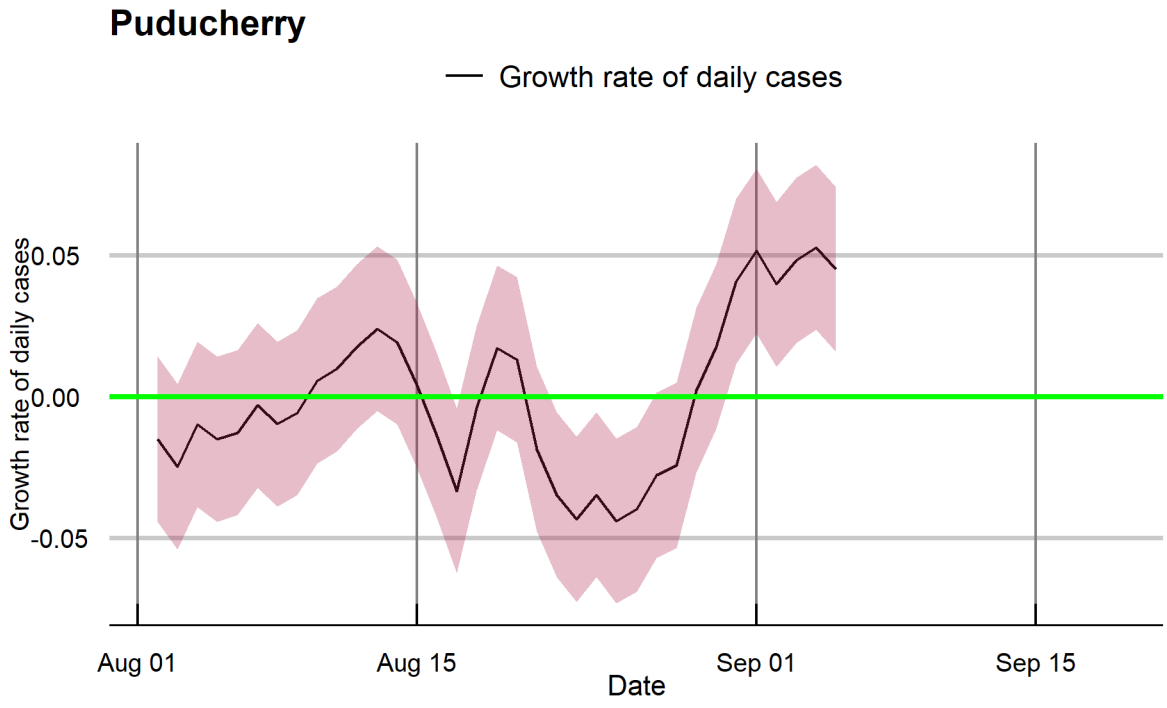

Nagaland
Data
Forecast
New cases
Forecast
Trend
150
100
50
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

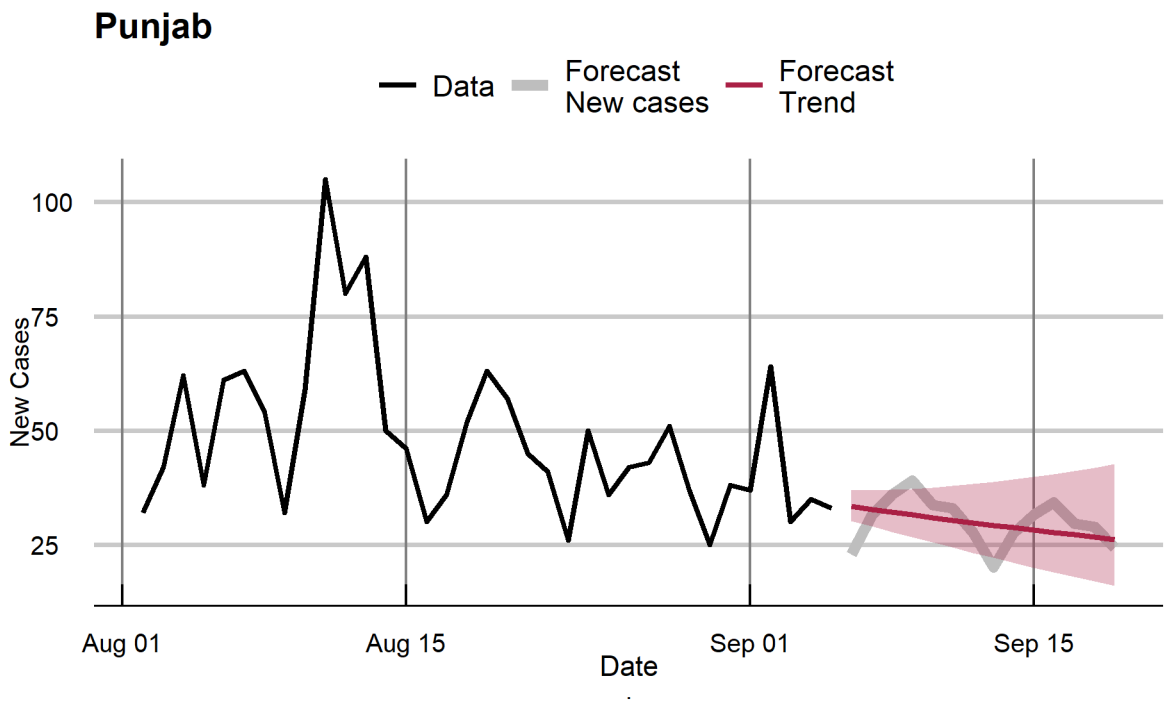

Nagaland
Growth rate of daily cases
0.05
0.00
-0.05
-0.10
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

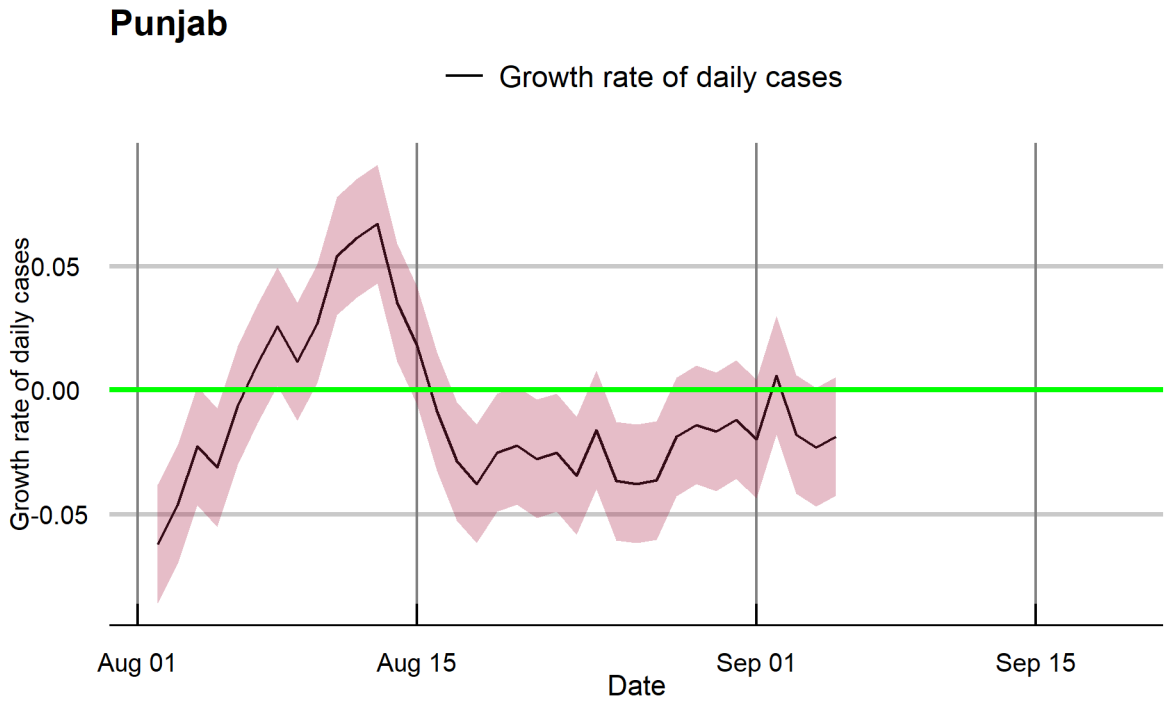

Odisha
Data
Forecast
New cases
Forecast
Trend
1,200
1,000
800
600
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

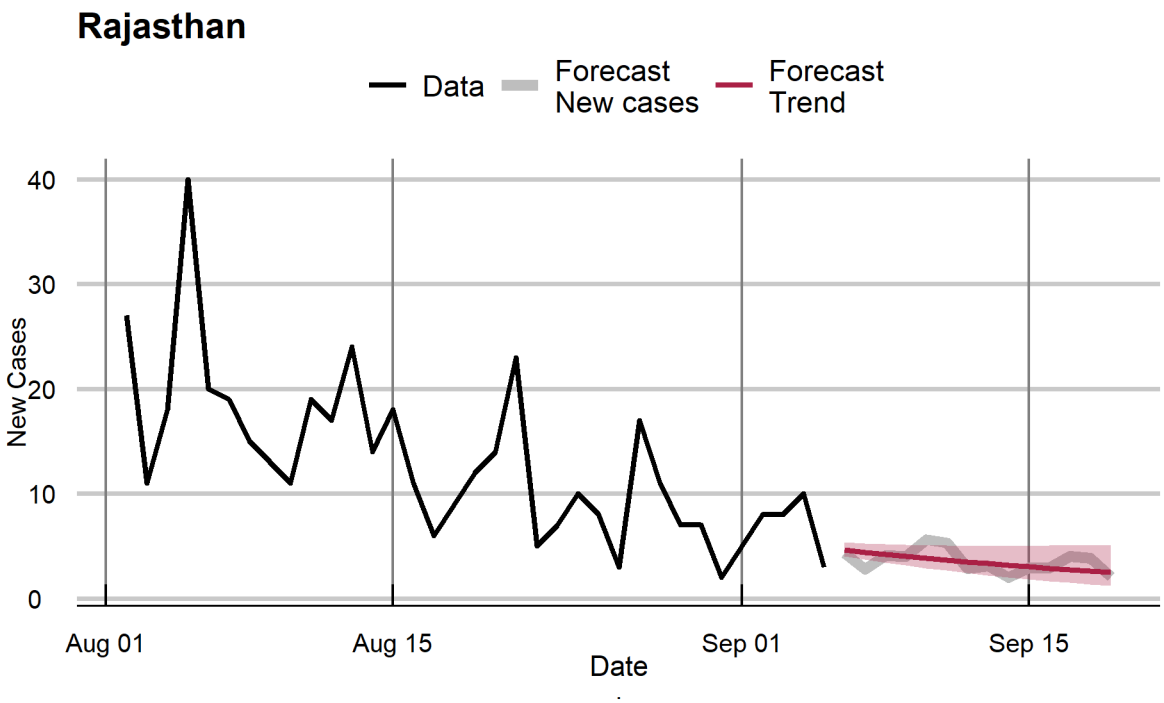

Odisha
Growth rate of daily cases
0.00
-0.02
-0.04
-0.06
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

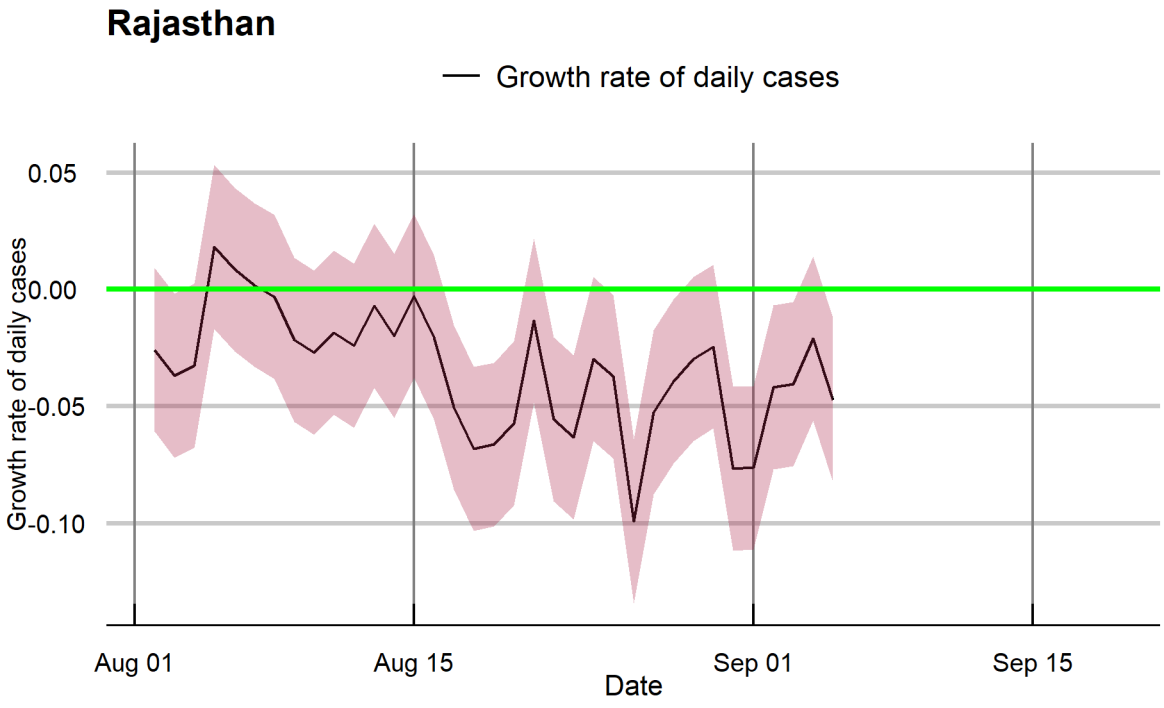

Puducherry
Data
Forecast
New cases
Forecast
Trend
400
300
200
100
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

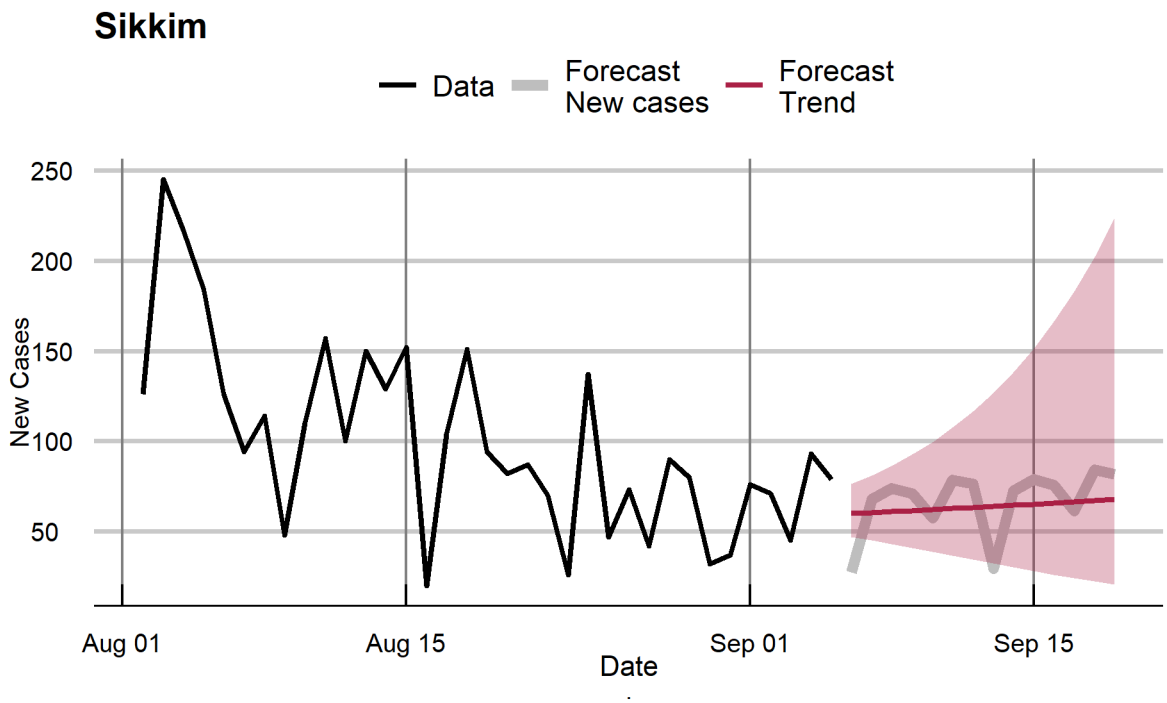

Puducherry
Growth rate of daily cases
0.05
0.00
-0.05
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

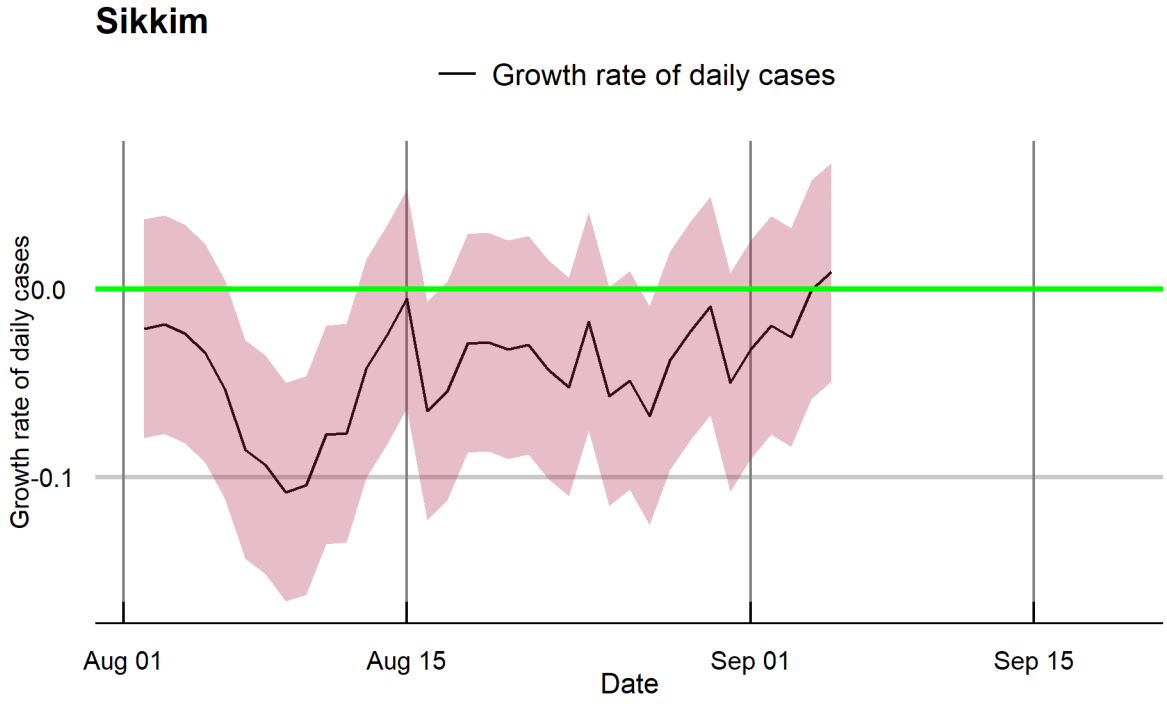

Punjab
Data
Forecast
New cases
Forecast
Trend
100
75
50
25
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date


Punjab
Growth rate of daily cases
0.05
0.00
-0.05
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

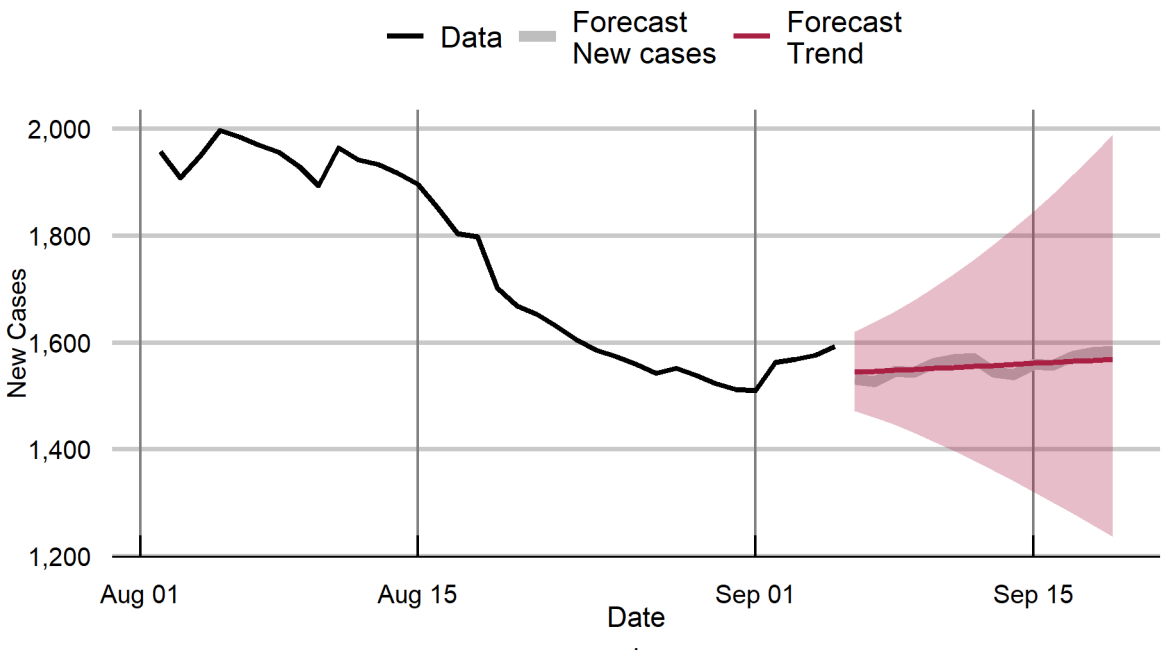

Rajasthan
Data
Forecast
New cases
Forecast
Trend
40
30
20
10
0
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date


Rajasthan
Growth rate of daily cases
0.05
0.00
-0.05
-0.10
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

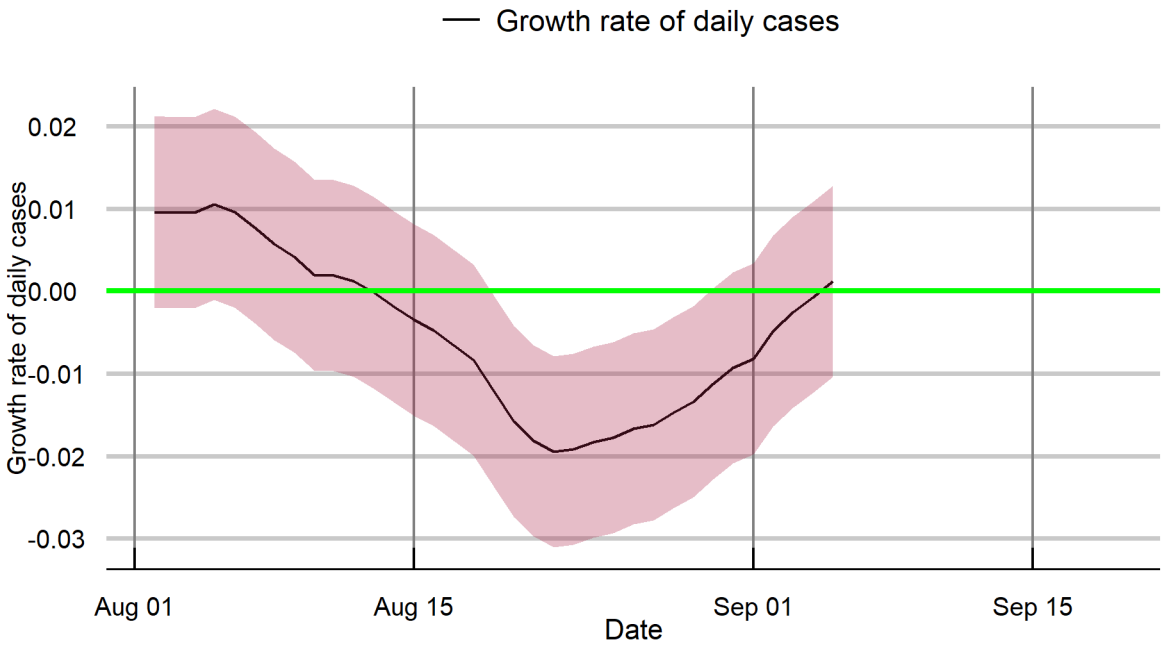

Sikkim
Data
Forecast
New cases
Forecast
Trend
250
200
150
100
50
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

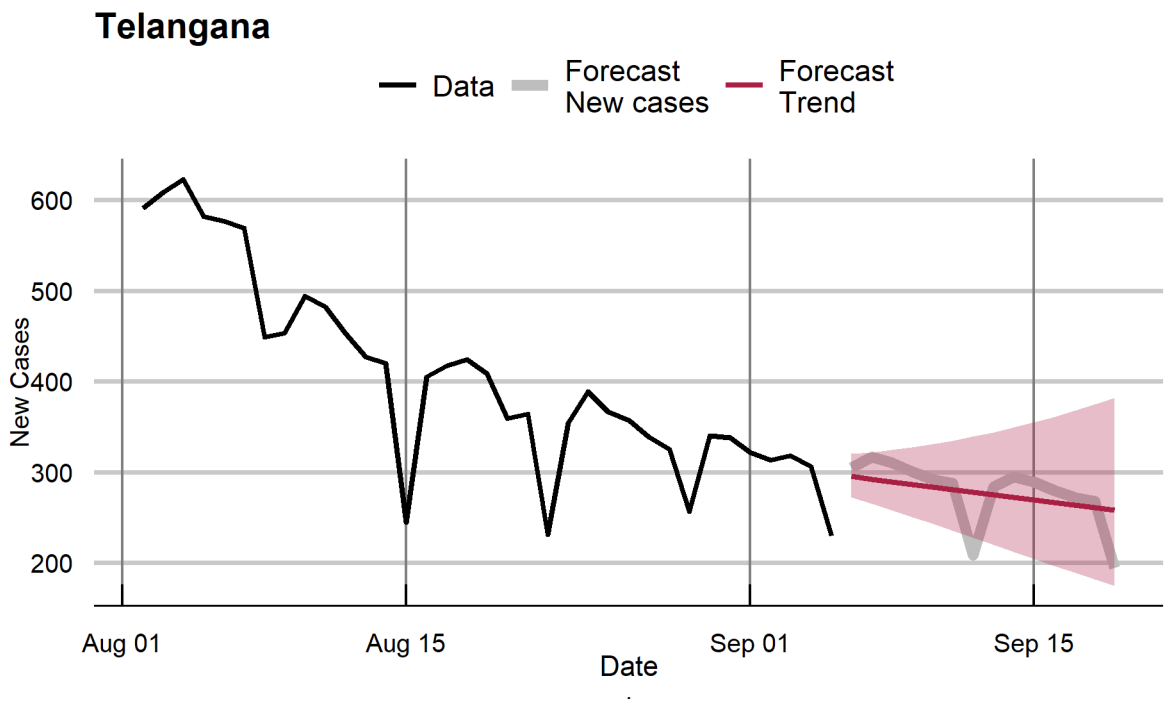

Sikkim
Growth rate of daily cases
0.0
-0.1
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

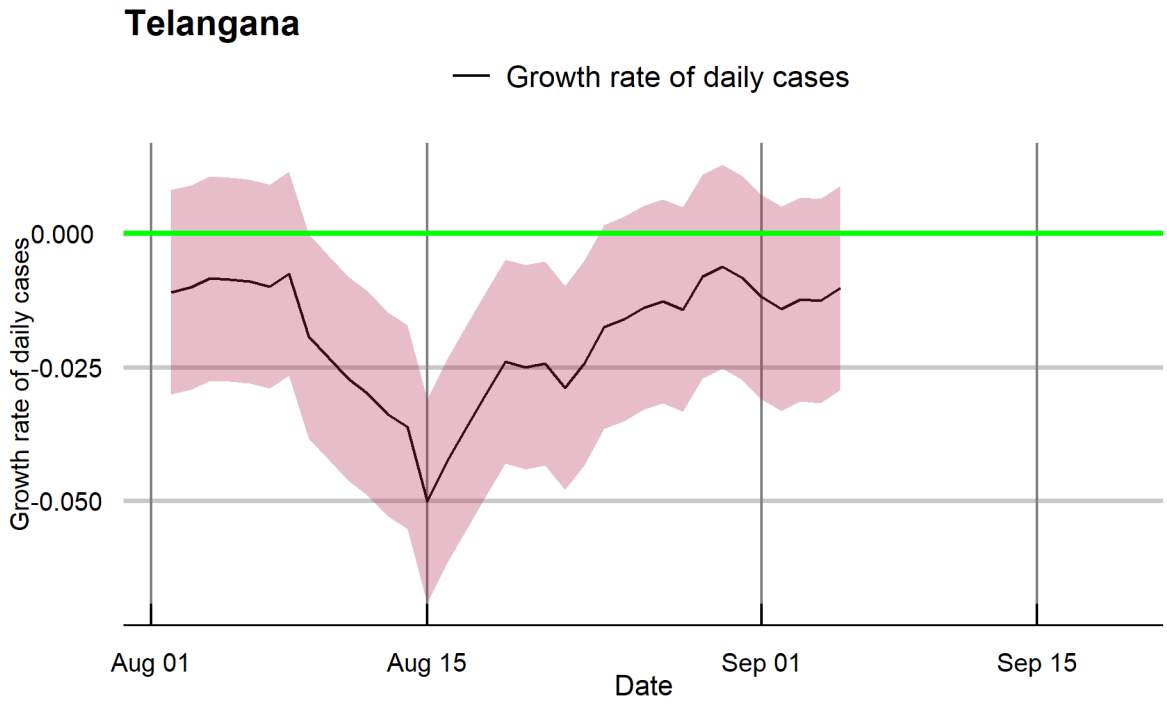
Tamil Nadu

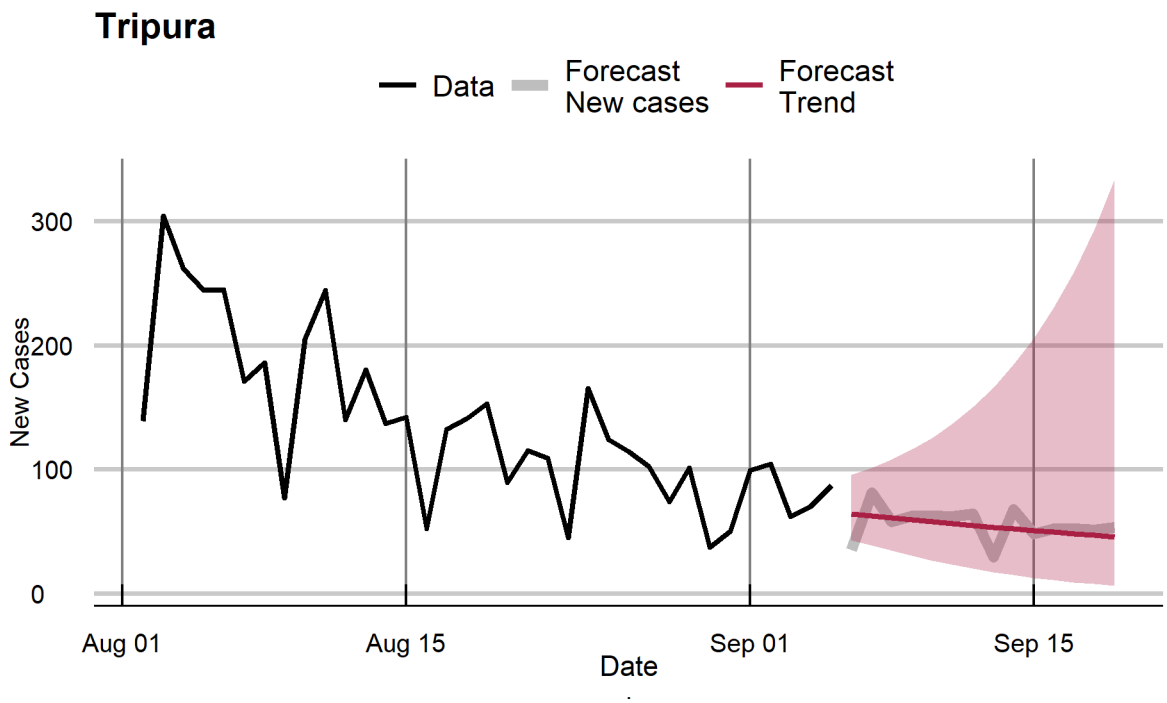


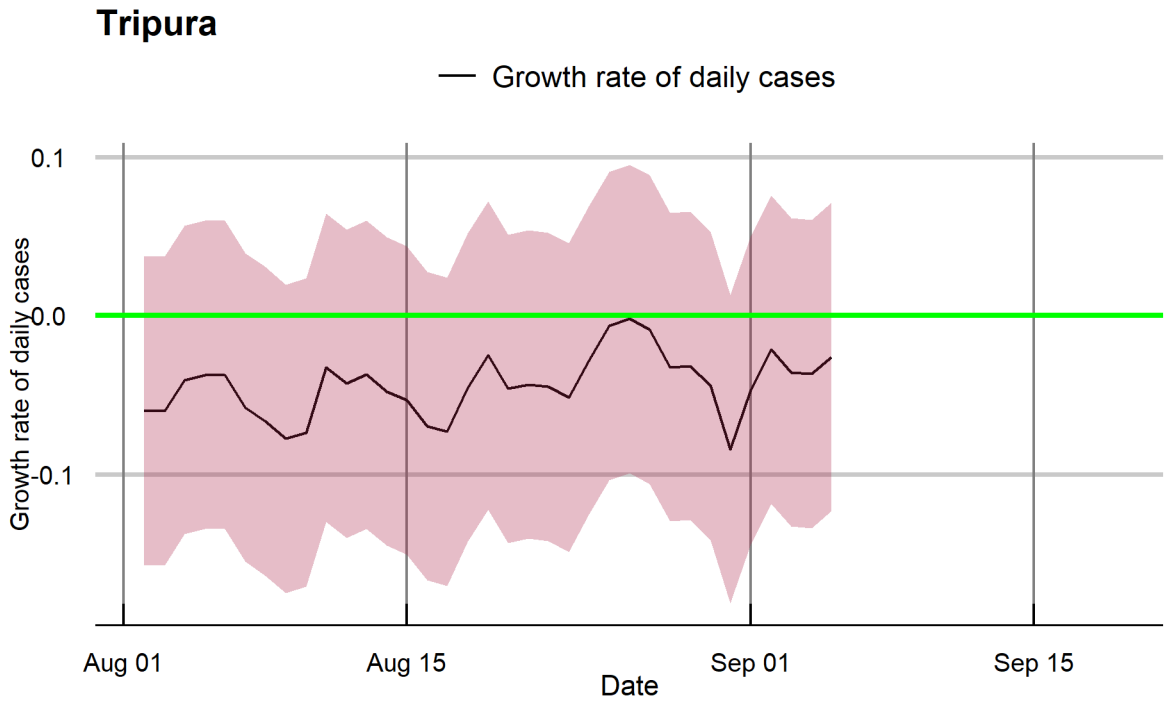
Tamil Nadu

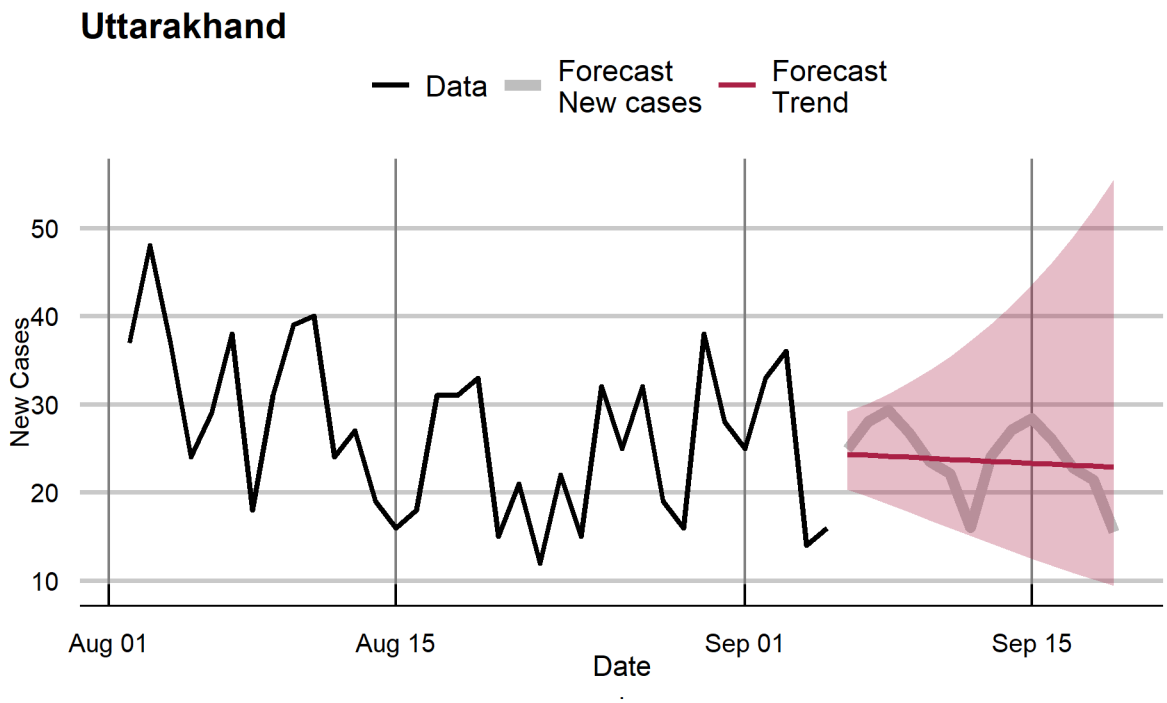


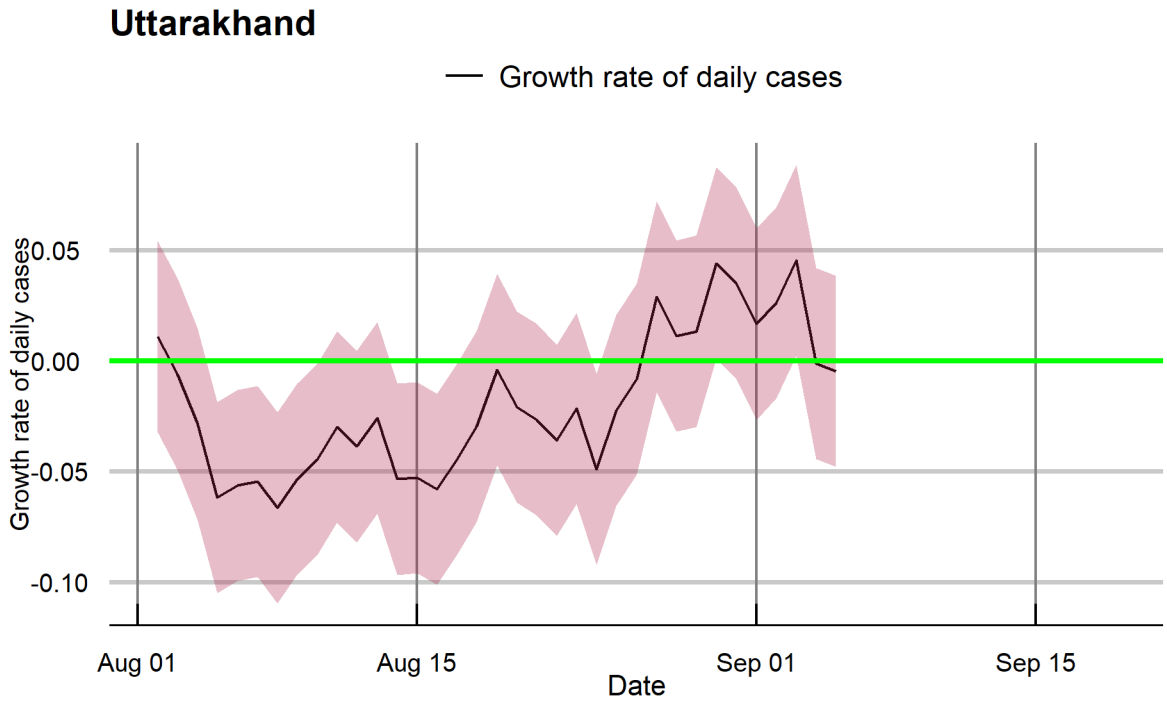

Telangana
Data
Forecast
New cases
Forecast
Trend
600
500
400
300
200
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

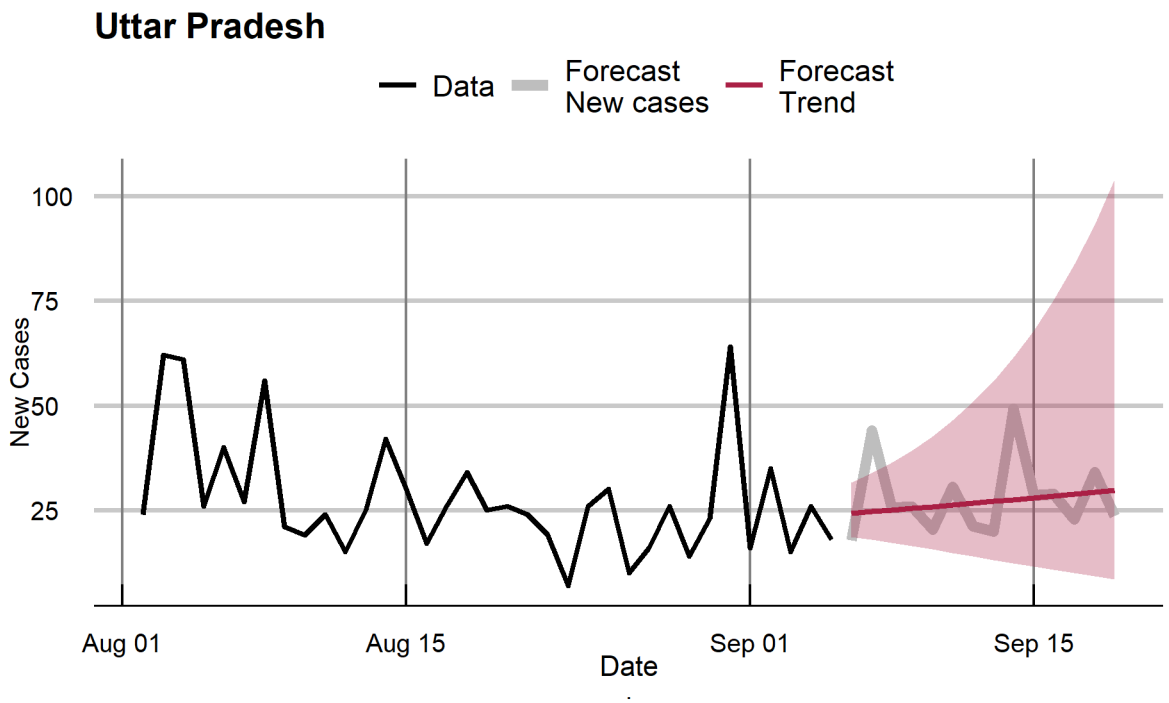

Telangana
Growth rate of daily cases
0.000
-0.025
-0.050
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

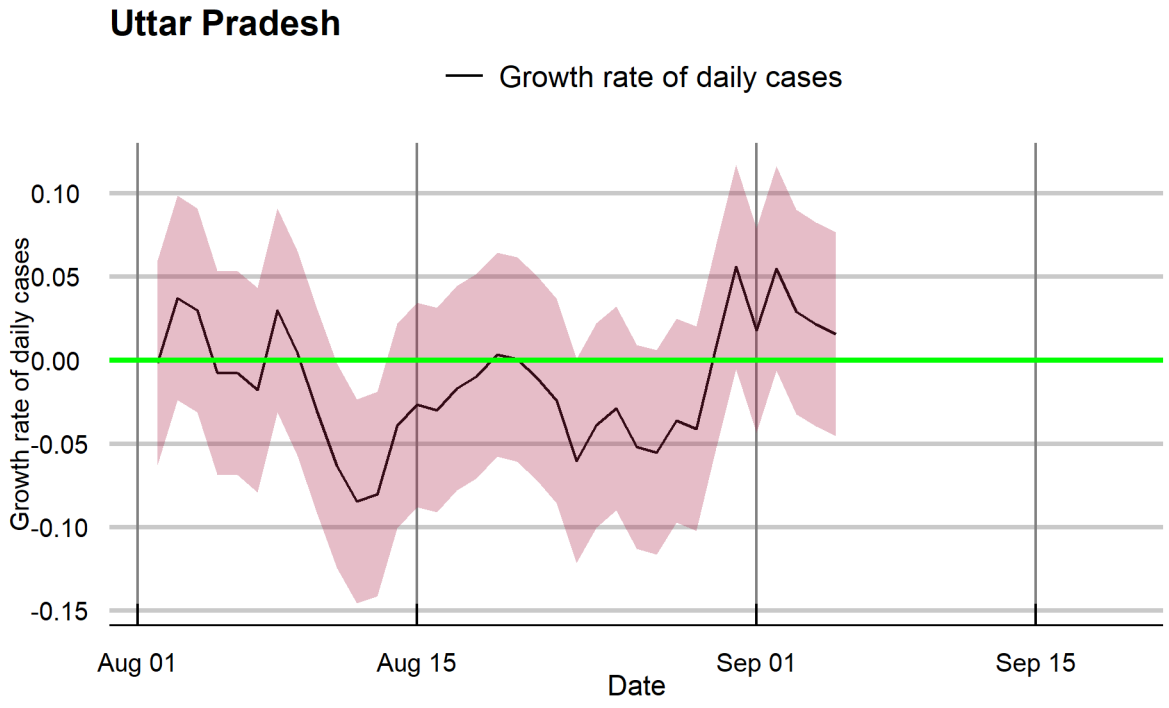

Tripura
Data
Forecast
New cases
Forecast
Trend
300
200
100
0
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

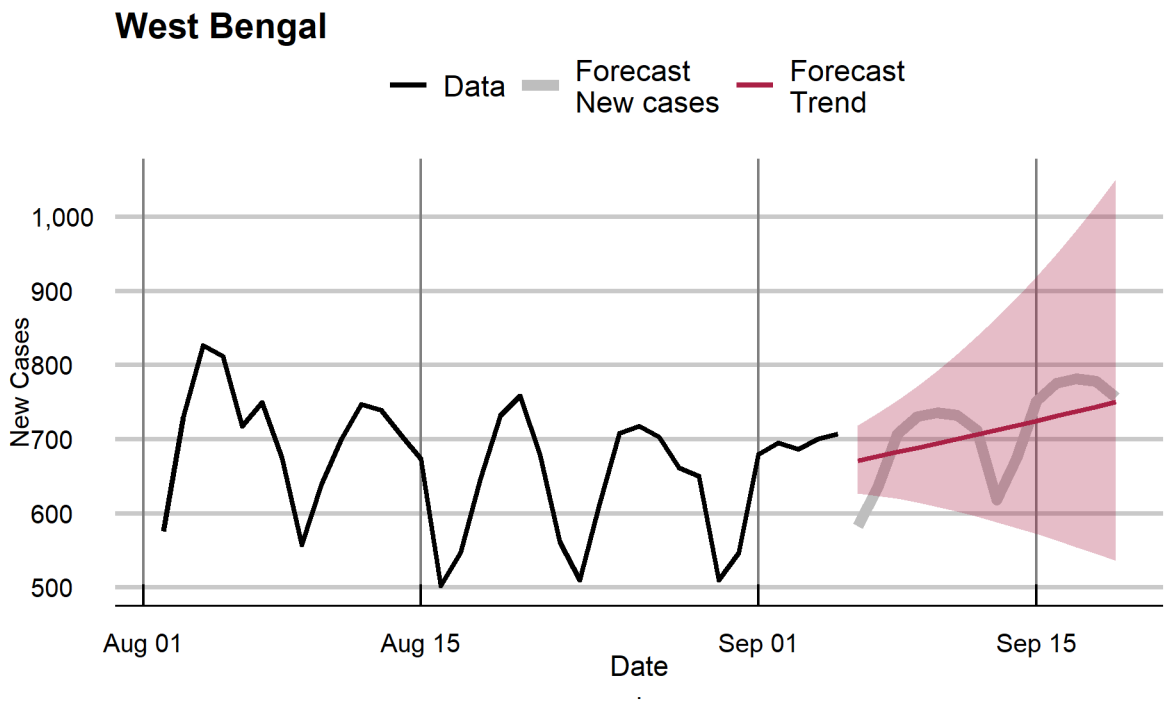

Tripura
Growth rate of daily cases
0.1
0.0
-0.1
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

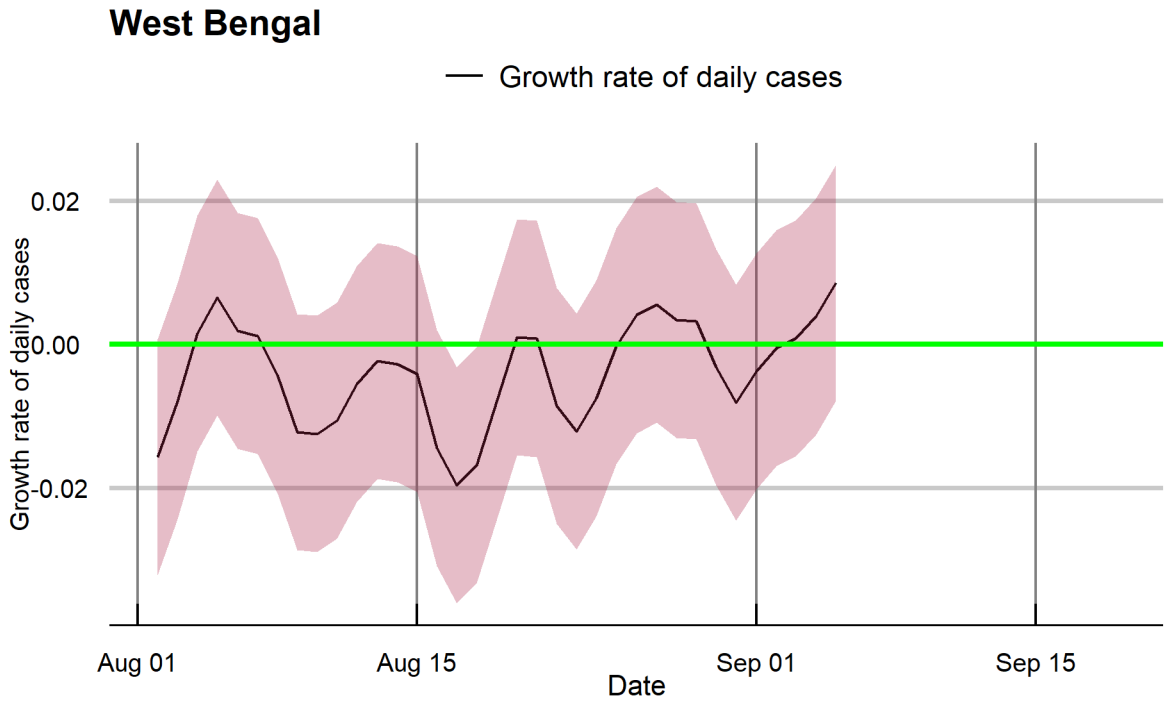

Uttarakhand
Data
Forecast
New cases
Forecast
Trend
New Cases
50
40
30
20
10
Aug 01
Aug 15
Sep 01
Sep 15
Date


Uttarakhand
Growth rate of daily cases
Growth rate of daily cases
0.05
0.00
-0.05
-0.10
Aug 01
Aug 15
Sep 01
Sep 15
Date

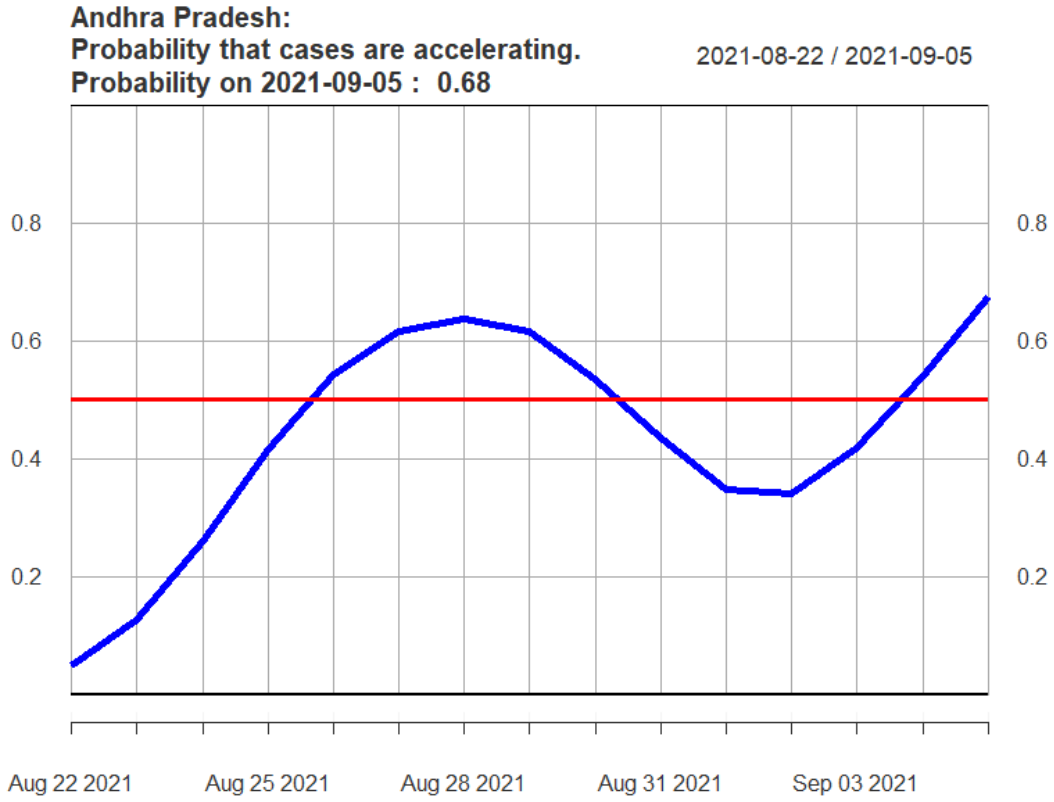

Uttar Pradesh
Data
Forecast
New cases
Forecast
Trend
100
75
50
25
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

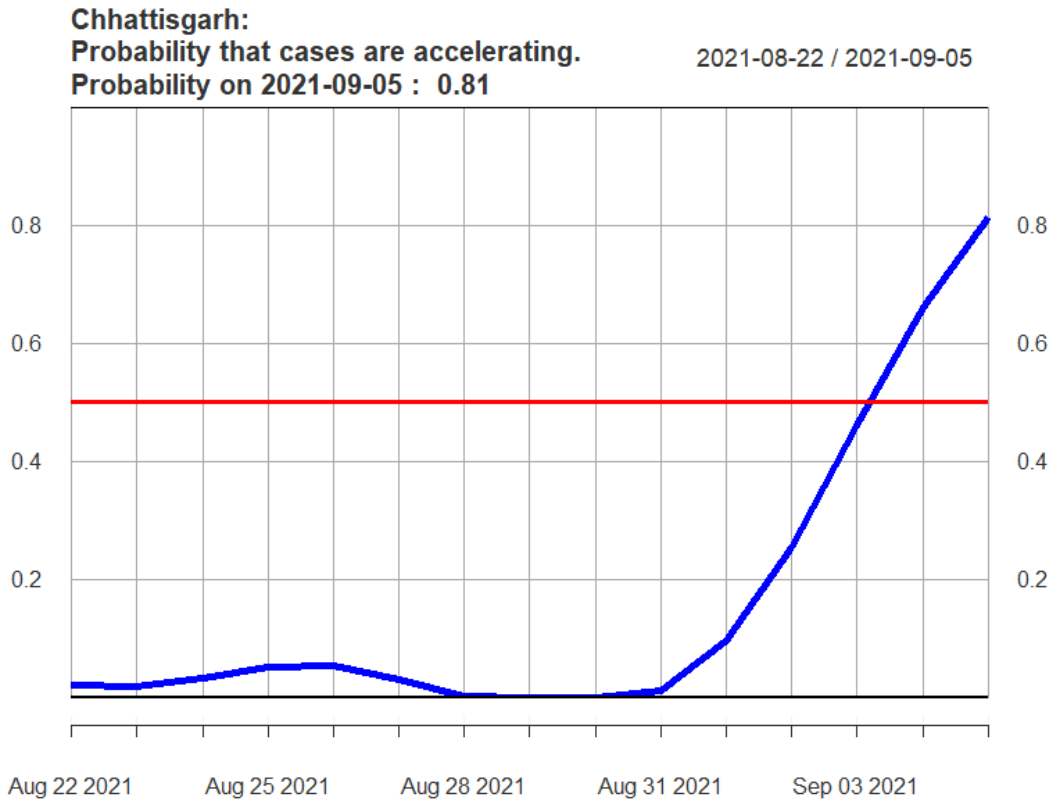

Uttar Pradesh
Growth rate of daily cases
0.10
0.05
0.00
-0.05
-0.10
-0.15
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date


West Bengal
Data
Forecast
New cases
Forecast
Trend
1,000
900
800
700
600
500
New Cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

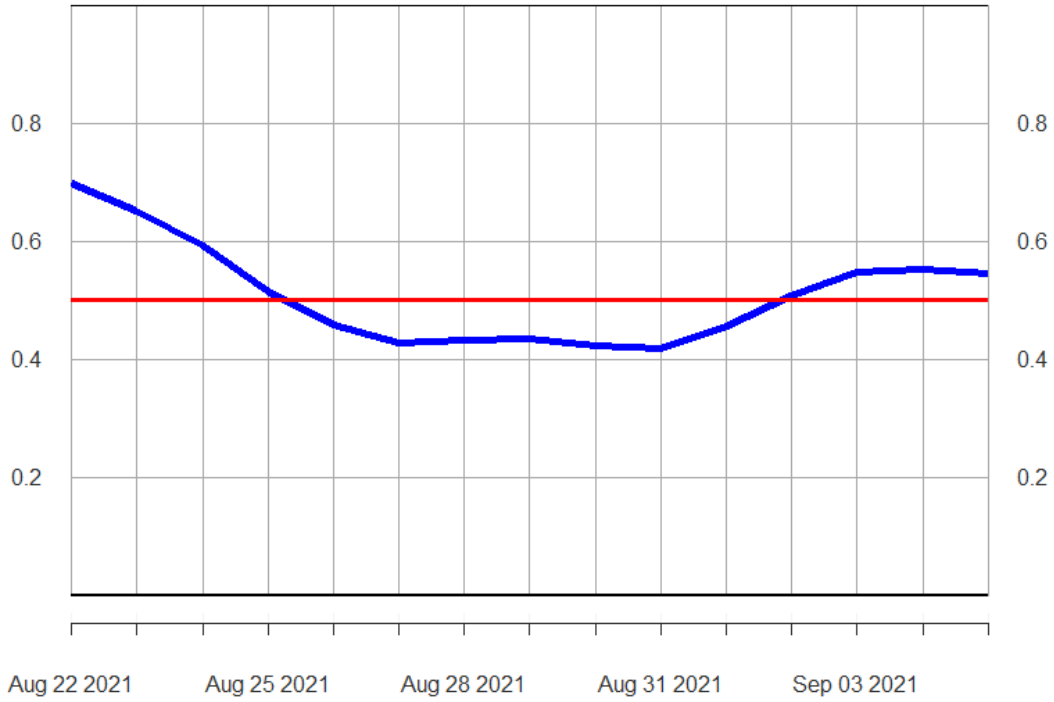

West Bengal
Growth rate of daily cases
0.02
0.00
-0.02
Growth rate of daily cases
Aug 01
Aug 15
Sep 01
Sep 15
Date

Probability that dailycasesare accelerating

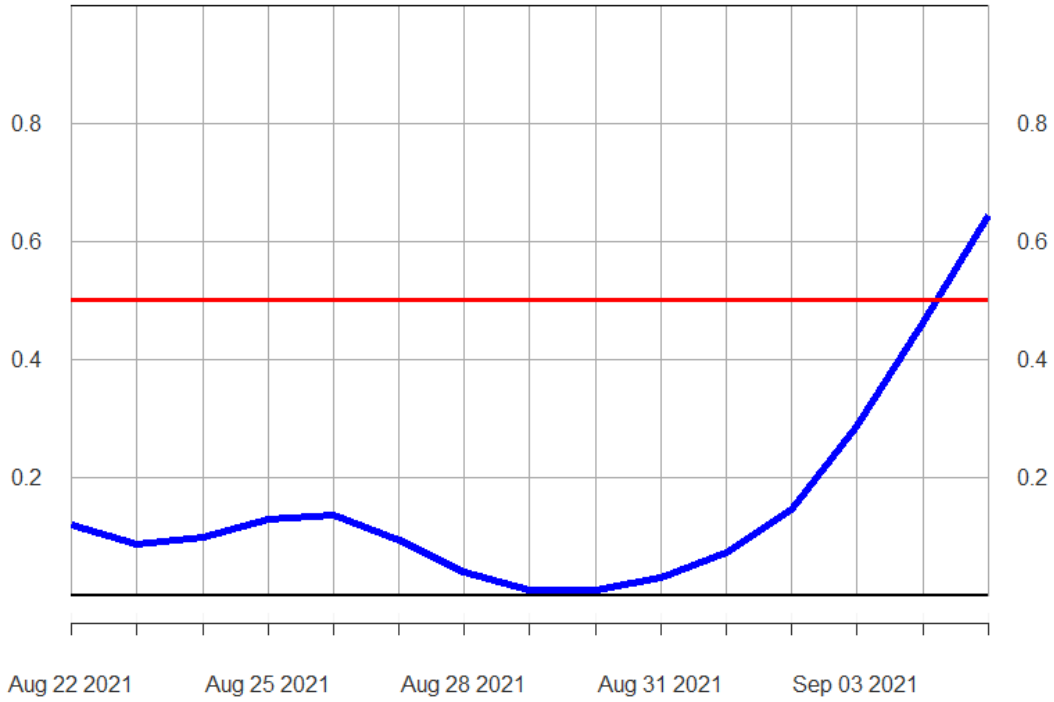


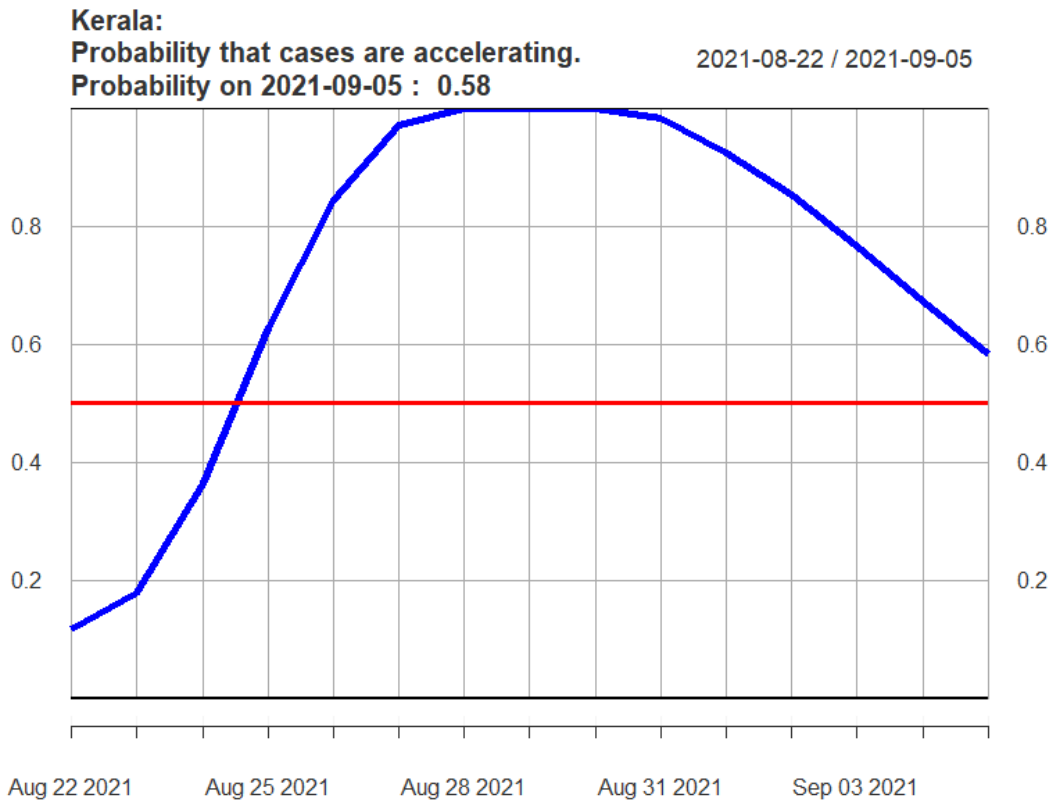


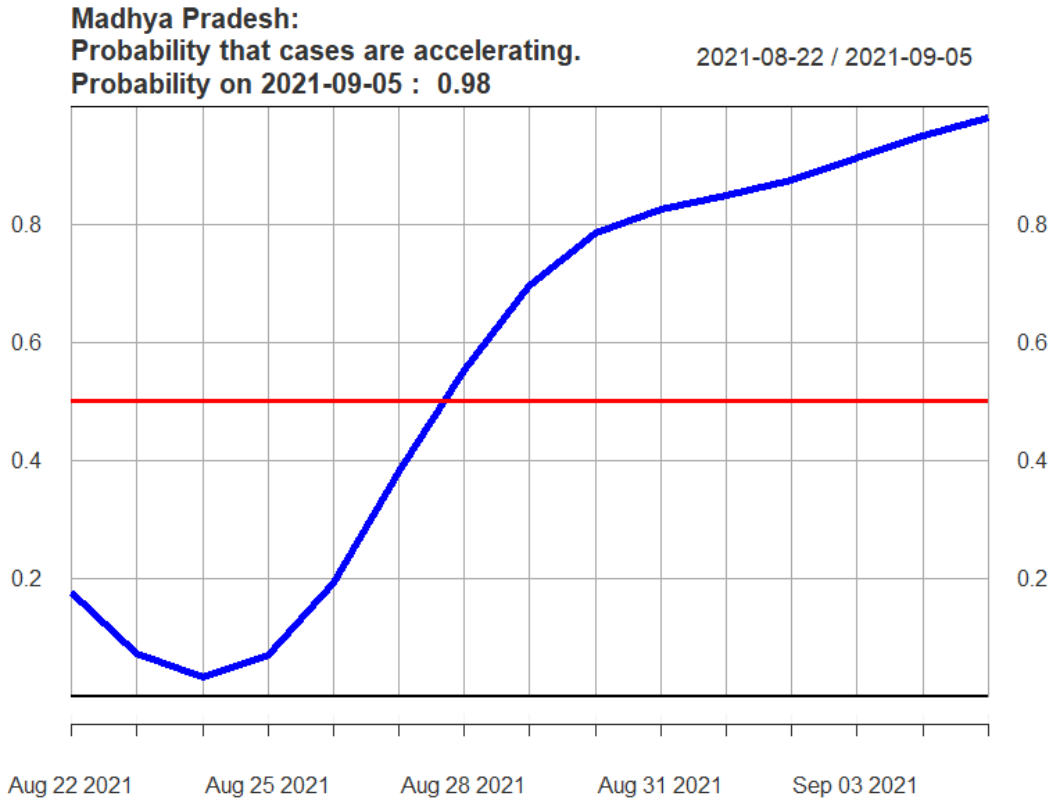
Goa:
Probability that cases are accelerating. 2021-08-22 / 2021-09-05
Probability on 2021-09-05 : 0.55

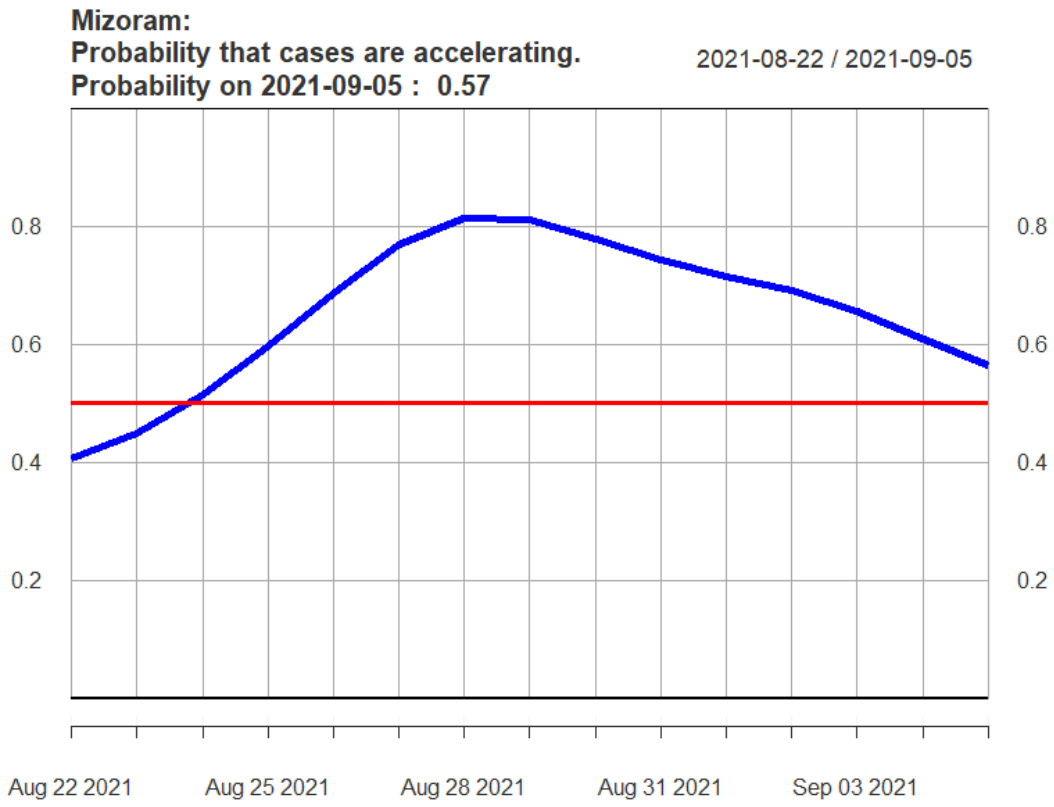


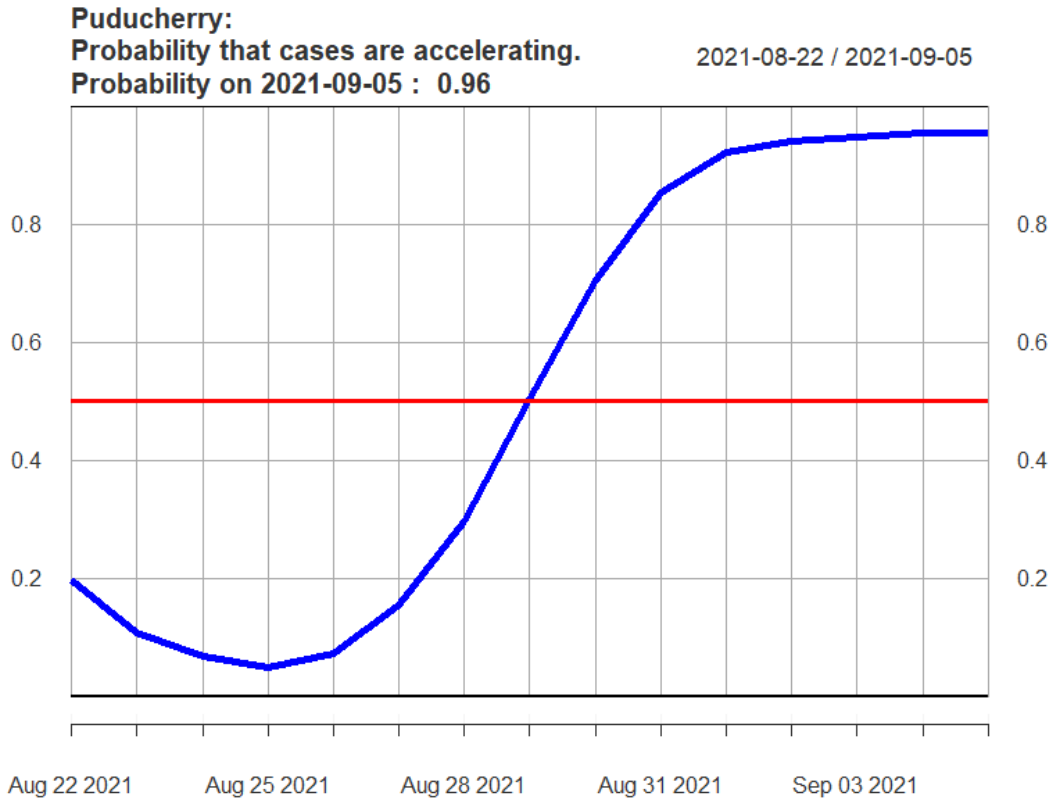
Gujarat:
Probability that cases are accelerating. 2021-08-22 / 2021-09-05
Probability on 2021-09-05 : 0.64

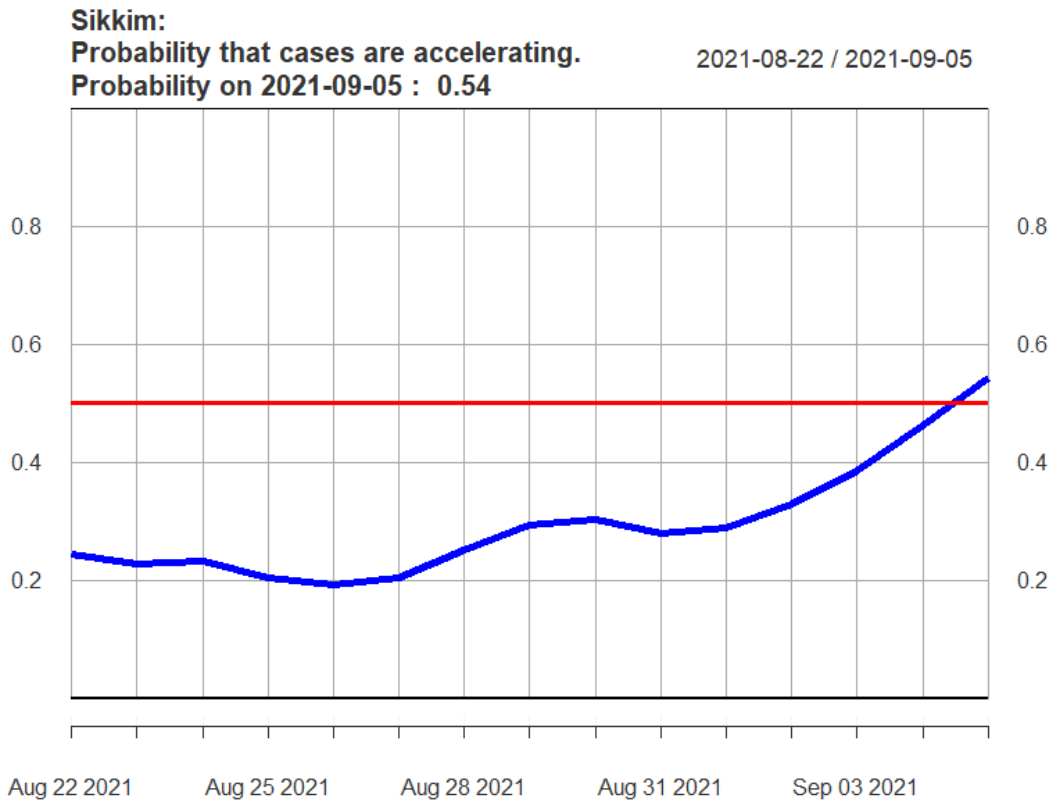


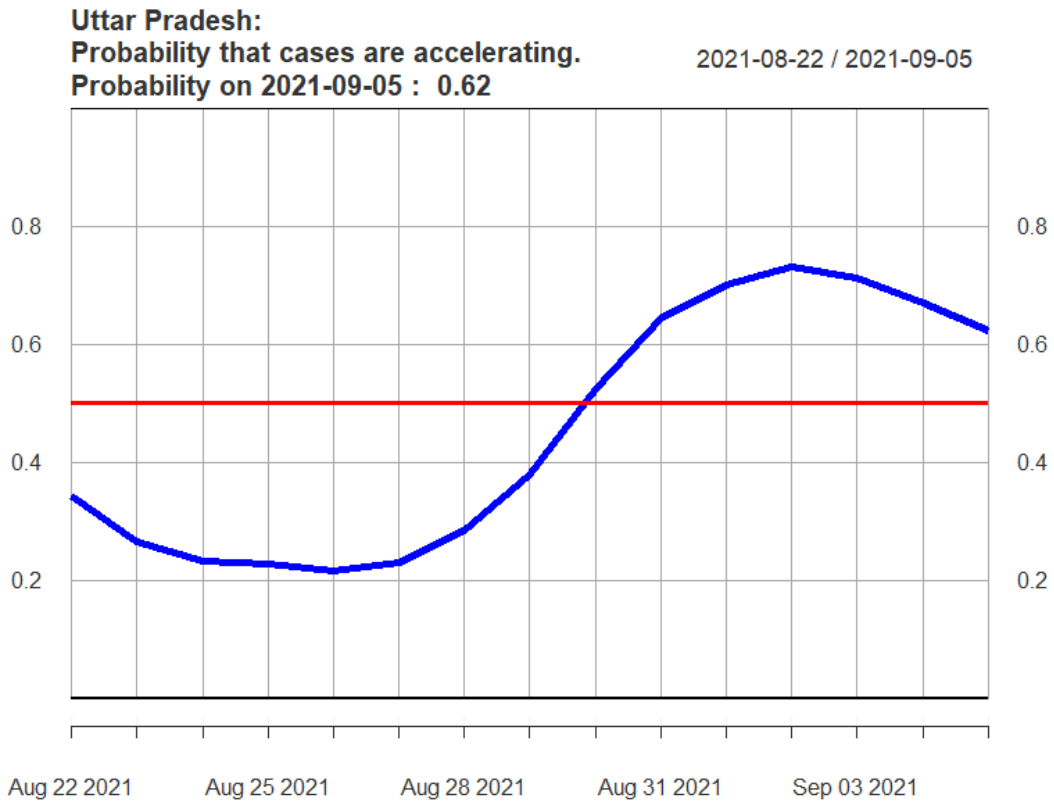

Kerala:
Probability that cases are accelerating.
Probability on 2021-09-05 : 0.58
2021-08-22 / 2021-09-05
0.8
0.6
0.4
0.2
Aug 22 2021
Aug 25 2021
Aug 28 2021
Aug 31 2021
Sep 03 2021

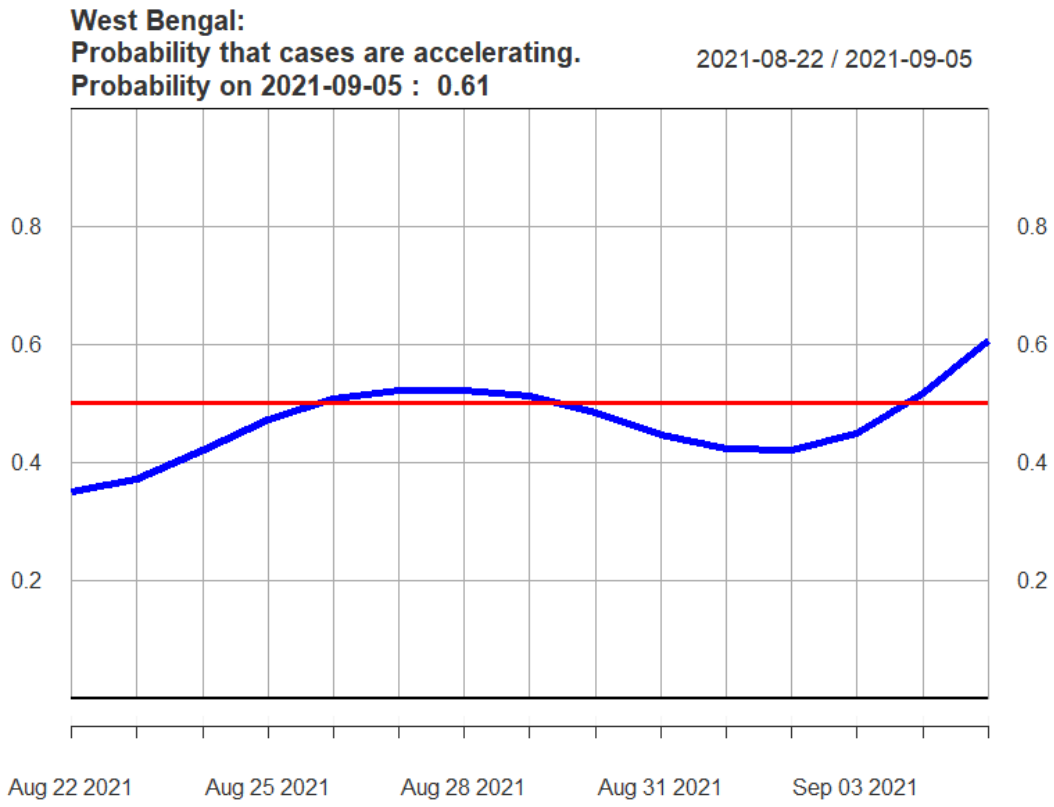

Madhya Pradesh:
Probability that cases are accelerating.
Probability on 2021-09-05 : 0.98
2021-08-22 / 2021-09-05
0.8
0.6
0.4
0.2
Aug 22 2021
Aug 25 2021
Aug 28 2021
Aug 31 2021
Sep 03 2021


Mizoram:
Probability that cases are accelerating.
Probability on 2021-09-05 : 0.57
2021-08-22 / 2021-09-05
0.8
0.6
0.4
0.2
Aug 22 2021
Aug 25 2021
Aug 28 2021
Aug 31 2021
Sep 03 2021


Puducherry:
Probability that cases are accelerating.
Probability on 2021-09-05 : 0.96
2021-08-22 / 2021-09-05
0.8
0.6
0.4
0.2
Aug 22 2021
Aug 25 2021
Aug 28 2021
Aug 31 2021
Sep 03 2021

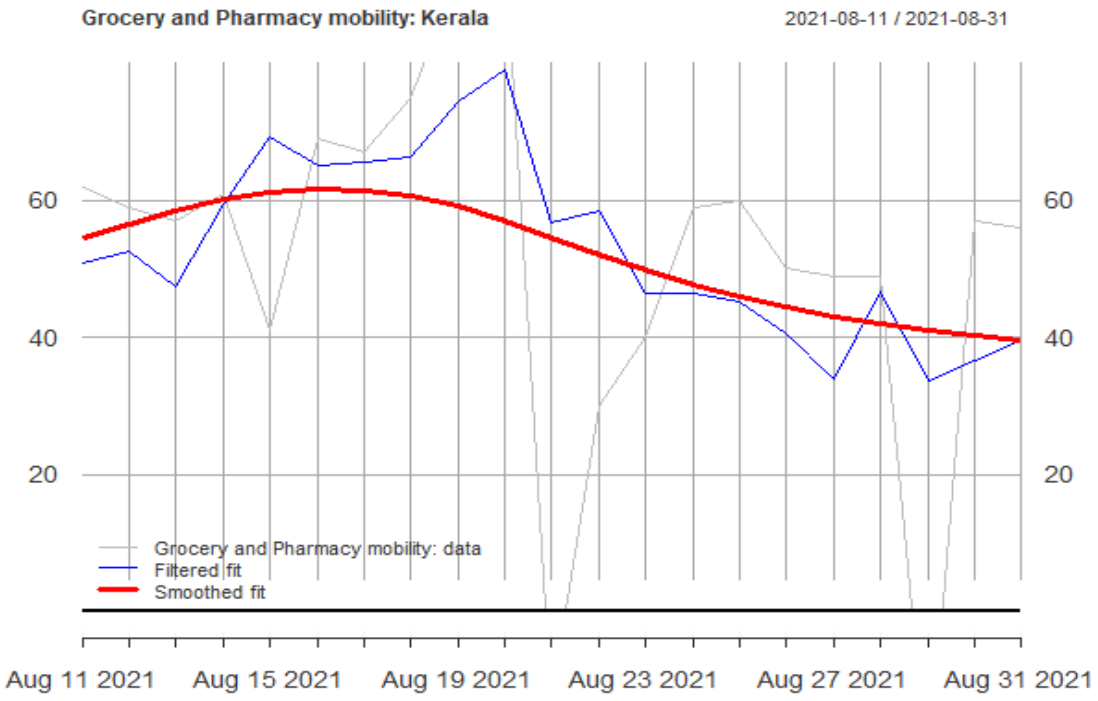

Sikkim:
Probability that cases are accelerating.
Probability on 2021-09-05 : 0.54
2021-08-22 / 2021-09-05
0.8
0.6
0.4
0.2
Aug 22 2021
Aug 25 2021
Aug 28 2021
Aug 31 2021
Sep 03 2021

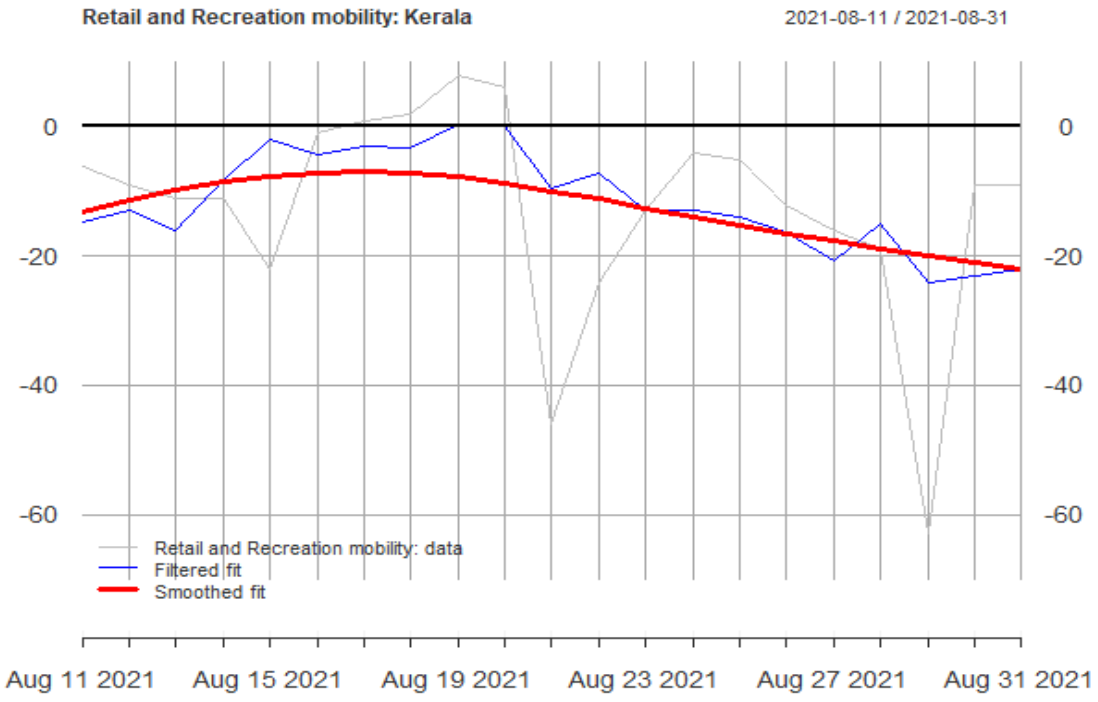

Uttar Pradesh:
Probability that cases are accelerating.
Probability on 2021-09-05 : 0.62
2021-08-22 / 2021-09-05
0.8
0.6
0.4
0.2
Aug 22 2021
Aug 25 2021
Aug 28 2021
Aug 31 2021
Sep 03 2021

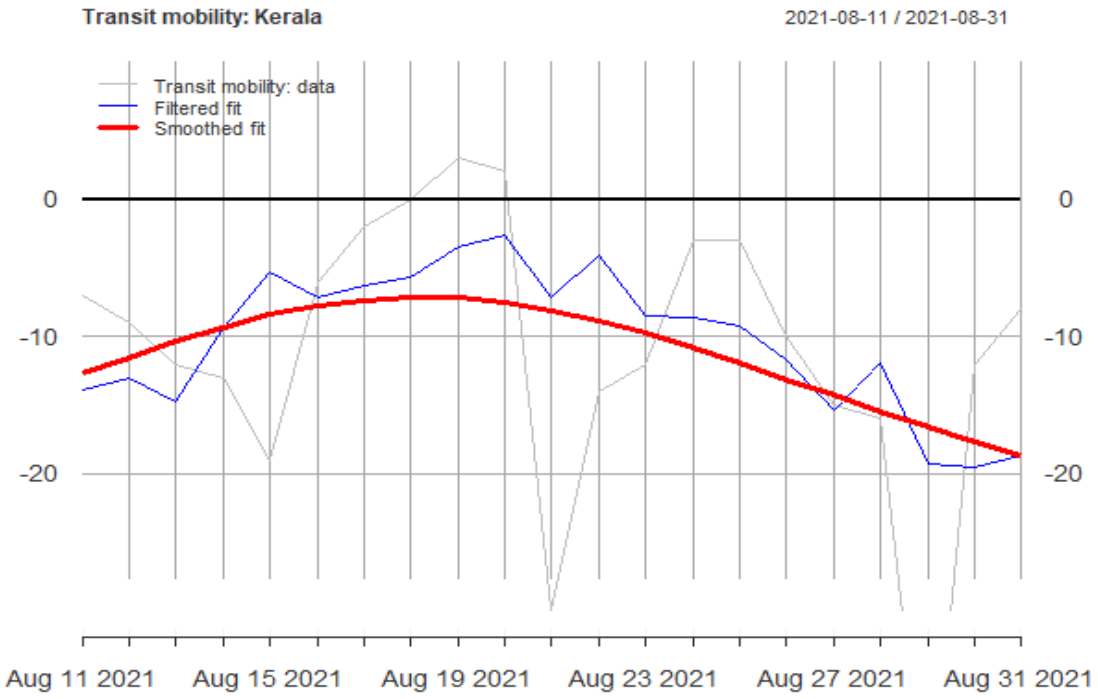

West Bengal:
Probability that cases are accelerating.
Probability on 2021-09-05 : 0.61
2021-08-22 / 2021-09-05
0.8
0.6
0.4
0.2
Aug 22 2021
Aug 25 2021
Aug 28 2021
Aug 31 2021
Sep 03 2021

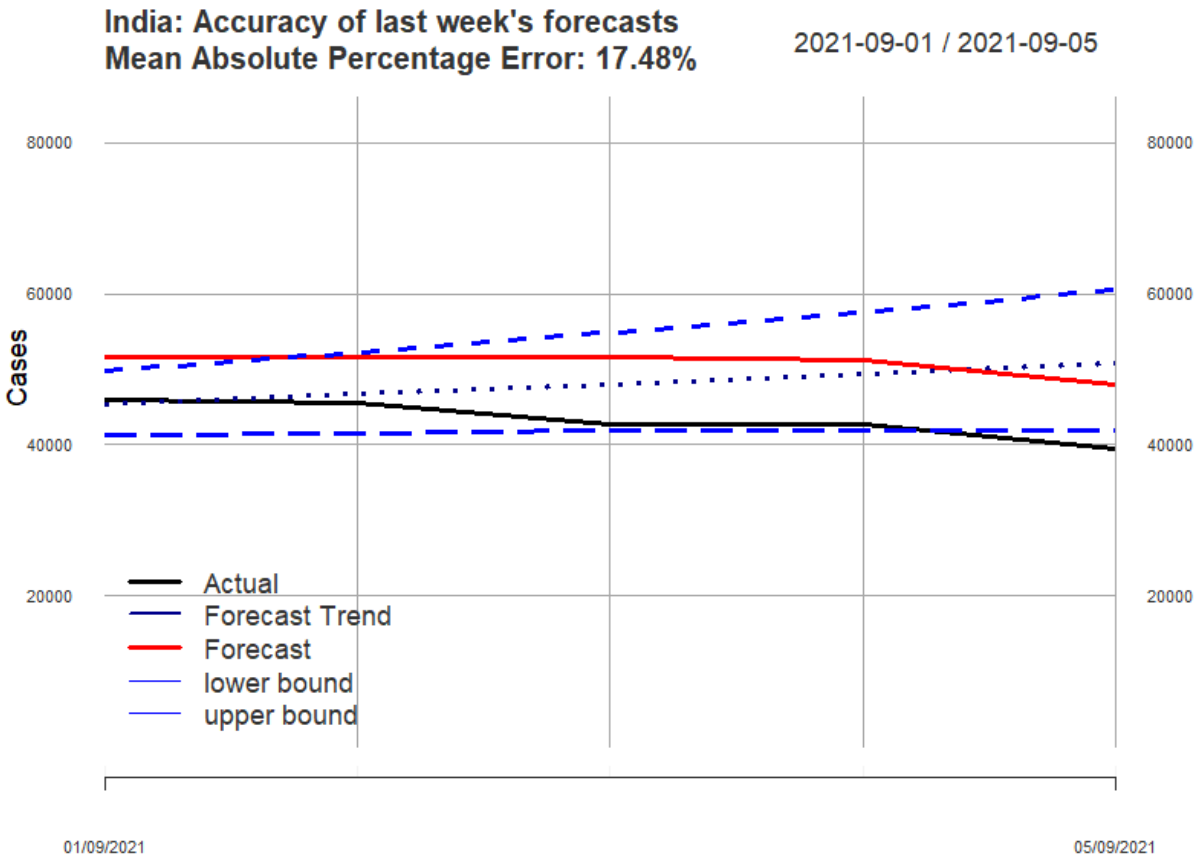
Recent mobility trends in Kerala where the growth rate of infection is declining

Change compared to pre-pandemic baseline which is the median value of mobility for the state over the 5 week period Jan 3 – Feb 6, 2020






Transit mobility: Kerala
2021-08-11 / 2021-08-31
Transit mobility: data
Filtered fit
Smoothed fit
0
-10
-20
Aug 11 2021
Aug 15 2021
Aug 19 2021
Aug 23 2021
Aug 27 2021
Aug 31 2021



Note: Actual cases in the period 1-5 September fell consistently below predictions for that period based on data till 31 August. This evidences the reduced transmission rate relative to the past, and is largely attributable to containment and restraint work in Kerala.

Notes

Data: COVID-19 confirmed cases and deaths data are sourced from COVID19-India API: https://api.covid19india.org/

New cases: forecasts. Forecasts above are based on a structural time series model that uses all the data in estimation but adapts to the trend emerging in the most recent period.

The method is described in: Harvey, A. and P. Kattuman (2020). Time series models based on growth curves with applications to forecasting coronavirus. Harvard Data Science Review, Special issue 1 - COVID-19. https://hdsr.mitpress.mit.edu/pub/ozgjx0yn/release/2, and Harvey, A., P. Kattuman, and C. Thamotheram (2021). Tracking the mutant: forecasting and nowcasting COVID 19 in the UK in 2021. National Institute Economic Review 256, 110-126. doi:10.1017/nie.2021.12.

Forecast accuracy is assessed using mean absolute percentage error of the forecasts of cases over the past week. Forecast accuracy will in general be lower for the smaller states / union territories. It is important to pay attention to the confidence intervals around the forecasts. The coverage of the confidence intervals presented is 68%, implying there is 16% probability of the upper bound being exceeded.

New cases: growth rate. The filtered trends presented for daily growth rates of cases are estimated using the Kalman filter, applied to the observed series. The method filters out day of the week effects and random noise to reveal the underlying signal. Unlike methods such as the moving average, this method adapts the trend to changes in real time and characterises underlying patterns of surges or attenuations that are hidden in the volatile series. The method is described in the papers listed above.

R: The R-estimates are based on the nowcast of the growth rate; the estimation approach is described in Harvey, A. and P. Kattuman (2021). A farewell to R: Time series models for tracking and forecasting epidemics. Journal of the Royal Society Interface (forthcoming). The confidence interval is based on one standard deviation, with coverage of 68%.

Probability. The probability that the growth of new cases is increasing at an increasing rate is extracted from the statistical model. The pandemic phase is of extreme concern when this probability exceeds 0.5

Mobility: All types of mobility other than work place mobility declined in the days leading to 31 August 2021, the last day for which mobility data is available.

Google community mobility reports show movement trends by region, across different categories of places. The data are created with aggregated, anonymized sets of data from users who have turned on the Location History setting in google devices. Categories group some of the places with similar characteristics for purposes of social distancing guidance, the available categories that are considered reliable for India are Grocery and Pharmacy, Retail and recreation, Transit

stations and Workplaces. Mobility trends hold useful information on the risk of increased transmission.

Note: The accuracy of forecasts rely on the quality of the published data. Further, changes in government pandemic policies and in transmission relevant social behaviour may lead realised numbers to deviate from forecasts.

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