

Cambridge Judge Business School
Cambridge Centre for Health Leadership & Enterprise

COVID-19 TRACKER: INDIA

12 February 2022



Centre for
**Health Leadership
& Enterprise**

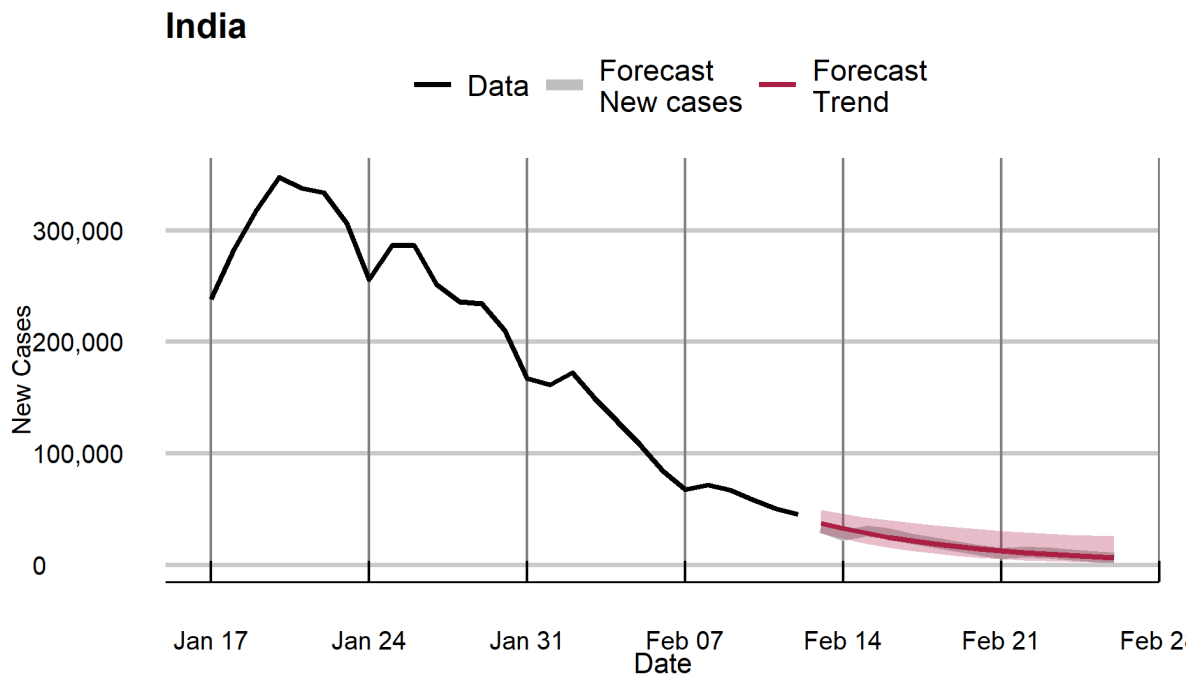


Reported daily COVID case numbers continue to plummet in India. The national reproduction number stood at 0.67 on 12th February, down from 0.71 on 6th. The filtered daily growth rate of cases has declined to -13.4% from -11.4% a week ago. The trend value of reported daily cases can be expected to drop to around 6000 nationally by 26th February.

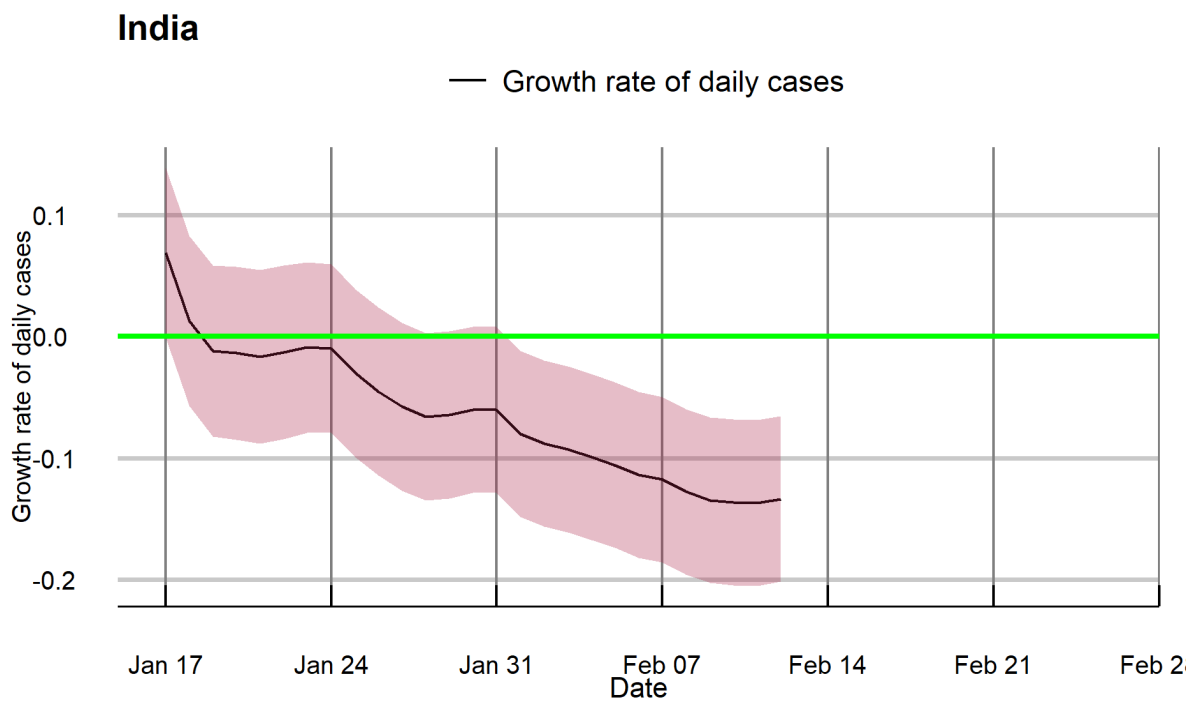
Reproduction numbers are well below 1 in all states and union territories and filtered daily growth rates are negative for all. Mizoram, the laggard in the current wave, peaked earlier than expected and now has a reproduction number of 0.91. Kerala is well entrained on the decline path and is likely to see about 2,000 daily reported cases in terms of underlying trend in two weeks, by 26th February.

The current Omicron wave is clearly coming to an end all across India, but localised flare ups cannot be ruled out and surveillance remains important.

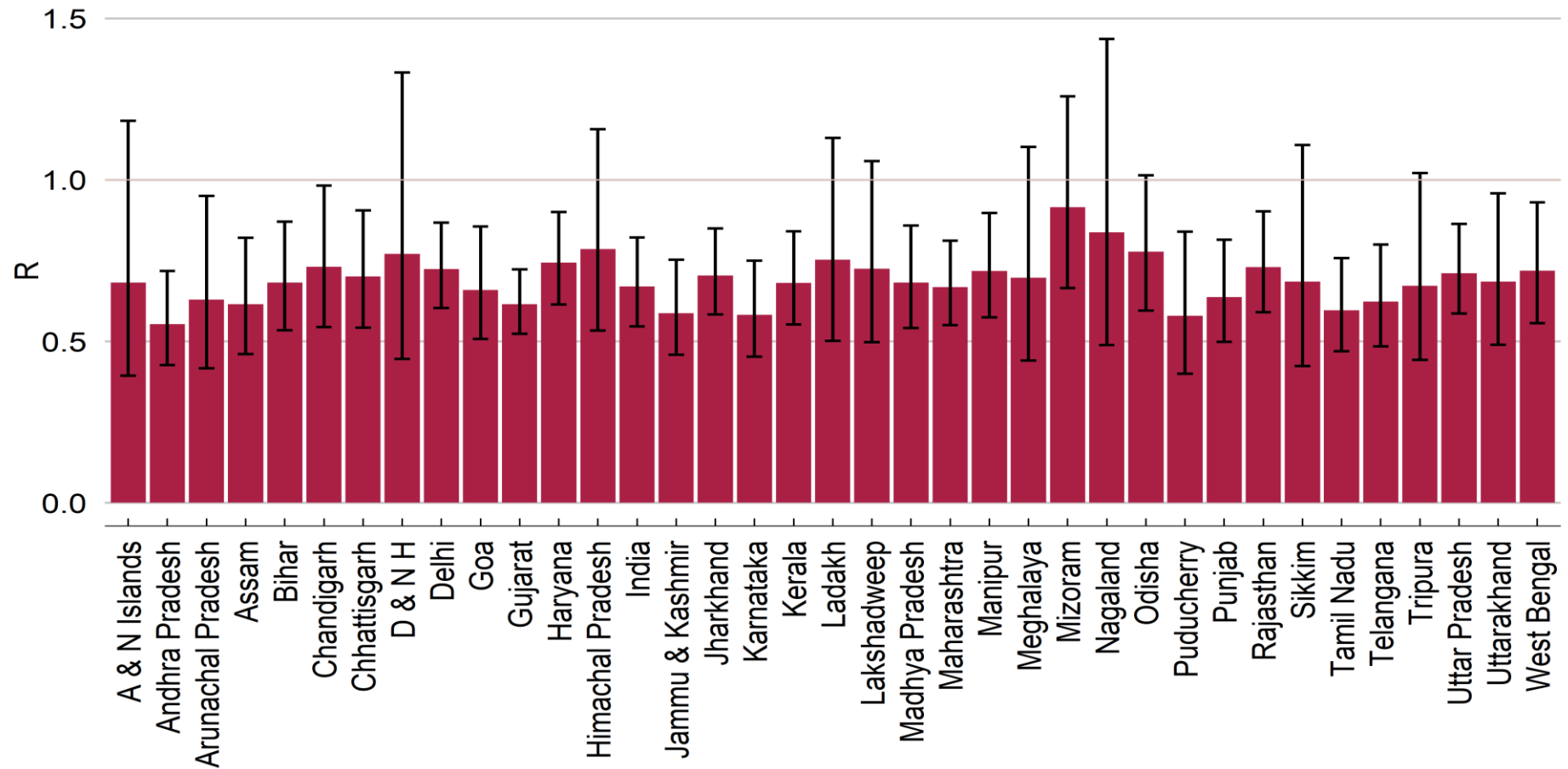
Forecasts of daily cases: 13th February to 26th February 2022



Filtered daily growth rates of new cases: days leading up to 12 February 2022



Reproduction numbers on 12th February 2022



Bar chart shows point estimates of R and confidence intervals with 95% coverage

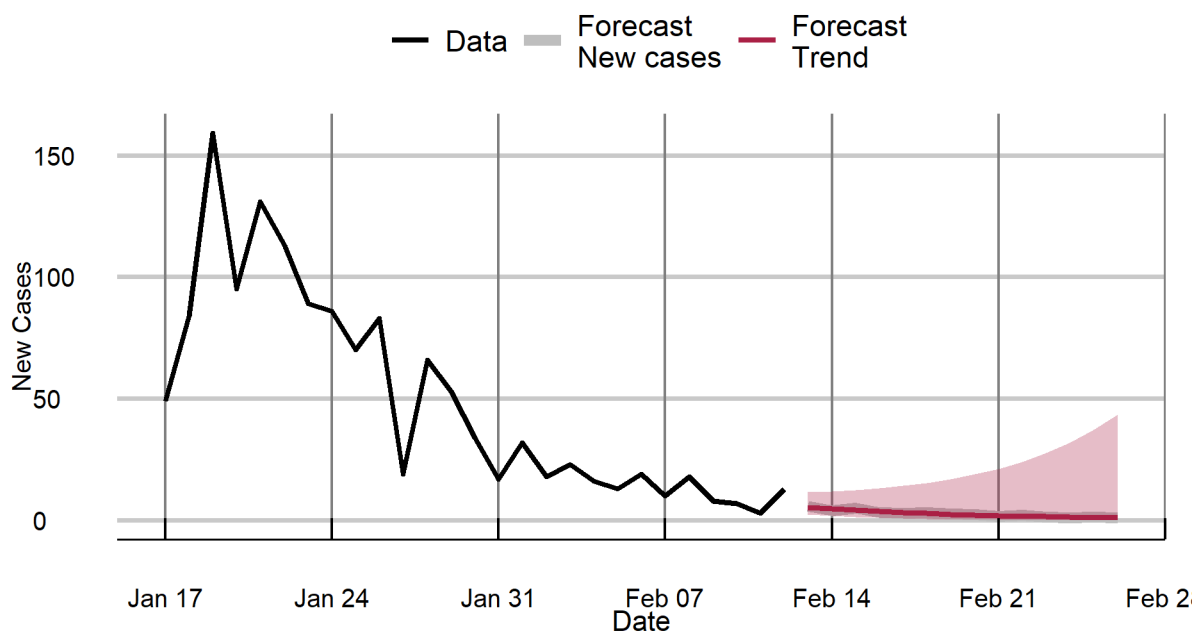
Note: Small numbers in Andaman and Nicobar Islands, Dadra and Nagar Haveli, Lakshadweep and Tripura make their estimates less reliable.

Reproduction numbers and Filtered daily growth rates: 12th February 2022

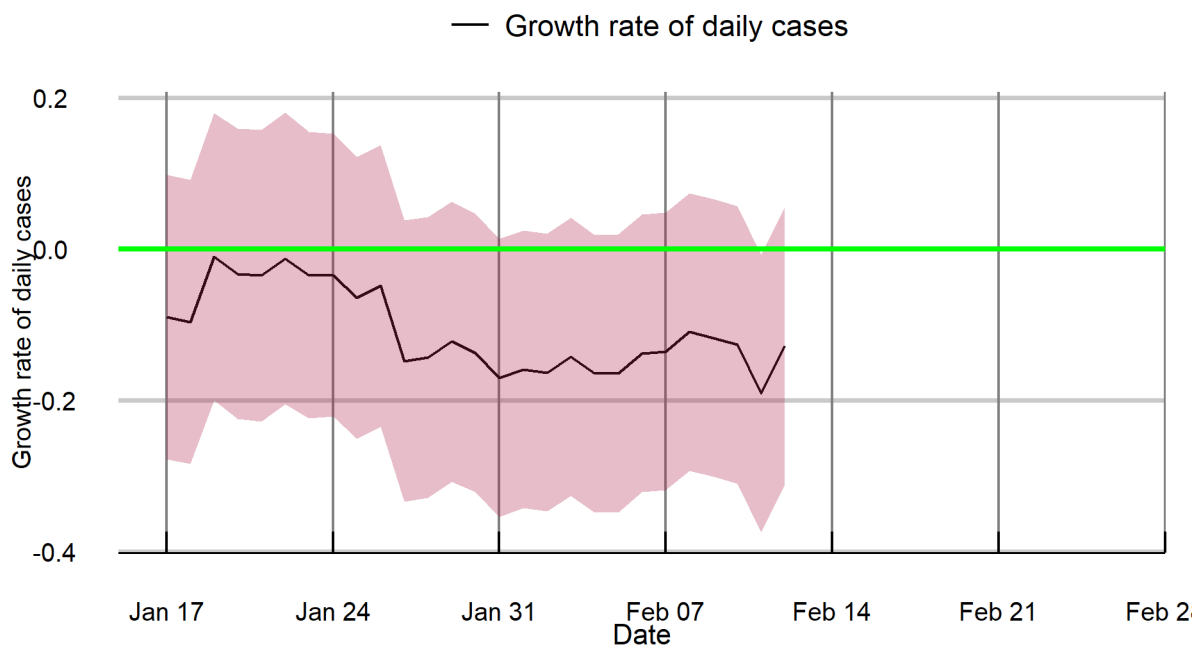
	Reproduction number	Filtered growth rate
India	0.67	-13.4%
A & N Islands	0.68	-12.8%
Andhra Pradesh	0.55	-19.7%
Arunachal Pradesh	0.63	-15.5%
Assam	0.61	-16.2%
Bihar	0.68	-12.8%
Chandigarh	0.73	-10.5%
Chhattisgarh	0.70	-11.9%
D & N H	0.77	-8.7%
Delhi	0.72	-10.8%
Goa	0.66	-13.9%
Gujarat	0.61	-16.2%
Haryana	0.74	-9.9%
Himachal Pradesh	0.79	-8.1%
Jammu & Kashmir	0.59	-17.7%
Jharkhand	0.70	-11.7%
Karnataka	0.58	-18.0%
Kerala	0.68	-12.8%
Ladakh	0.75	-9.5%
Lakshadweep	0.72	-10.7%
Madhya Pradesh	0.68	-12.8%
Maharashtra	0.67	-13.5%
Manipur	0.72	-11.1%
Meghalaya	0.70	-12.1%
Mizoram	0.91	-3.0%
Nagaland	0.84	-5.9%
Odisha	0.78	-8.4%
Puducherry	0.58	-18.2%
Punjab	0.64	-15.0%
Rajasthan	0.73	-10.5%
Sikkim	0.68	-12.6%
Tamil Nadu	0.60	-17.2%
Telangana	0.62	-15.8%
Tripura	0.67	-13.3%
Uttar Pradesh	0.71	-11.4%
Uttarakhand	0.68	-12.6%
West Bengal	0.72	-11.0%

Forecasts of daily cases and filtered daily growth rates of cases for states and union territories : 13th February to 26th February 2022

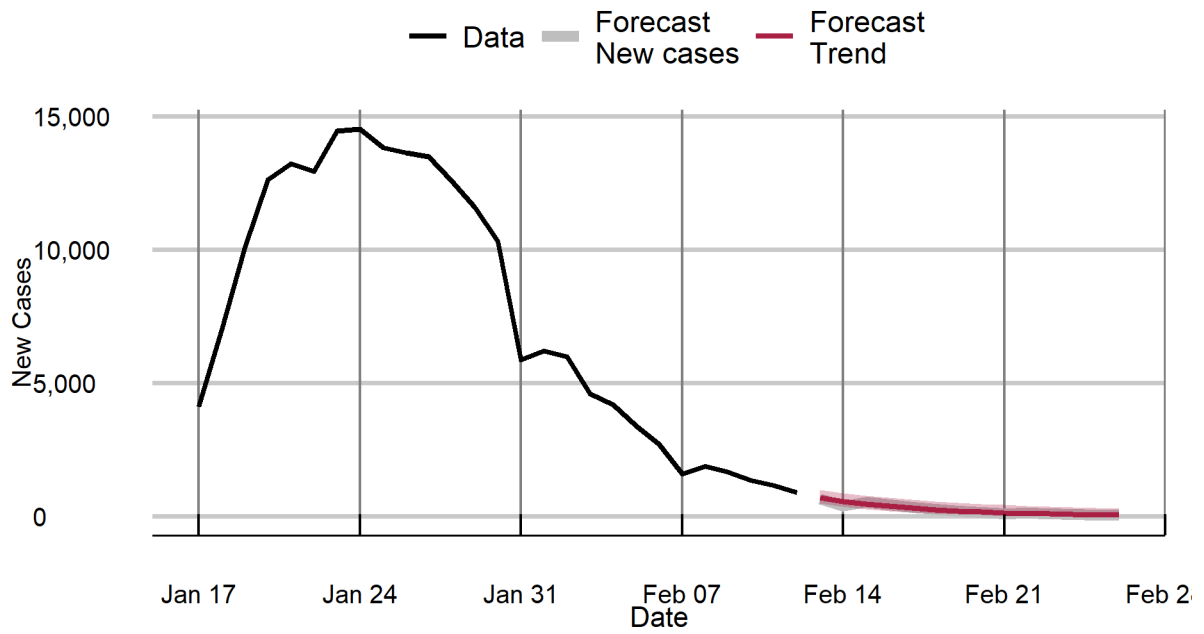
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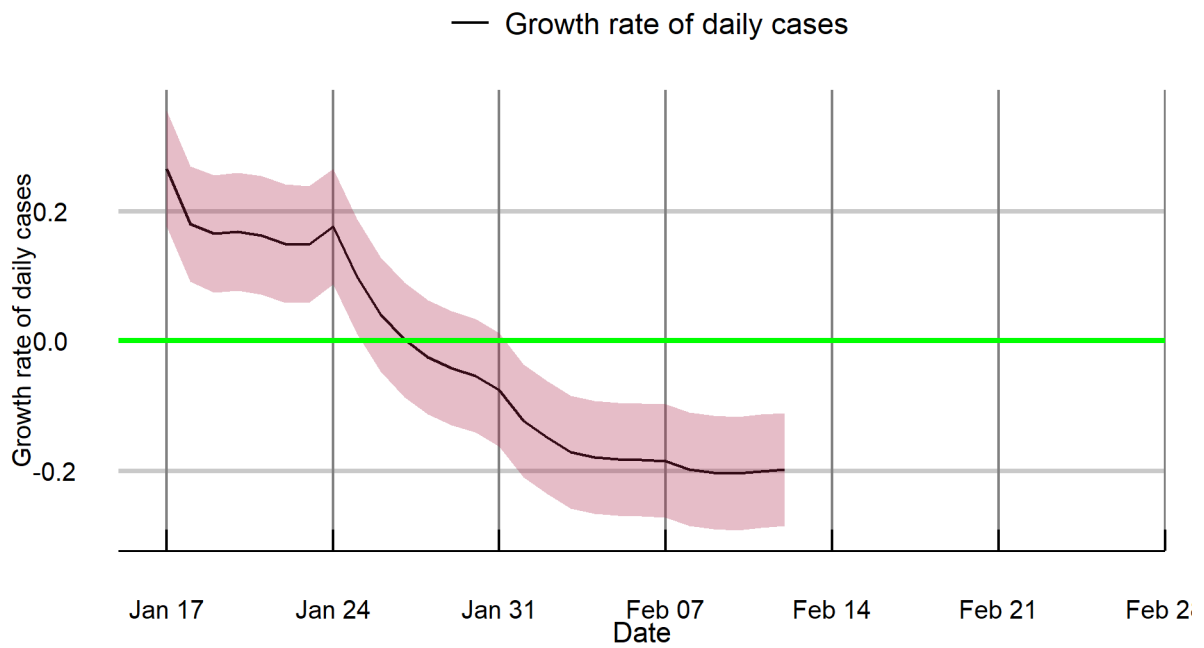
A & N Islands



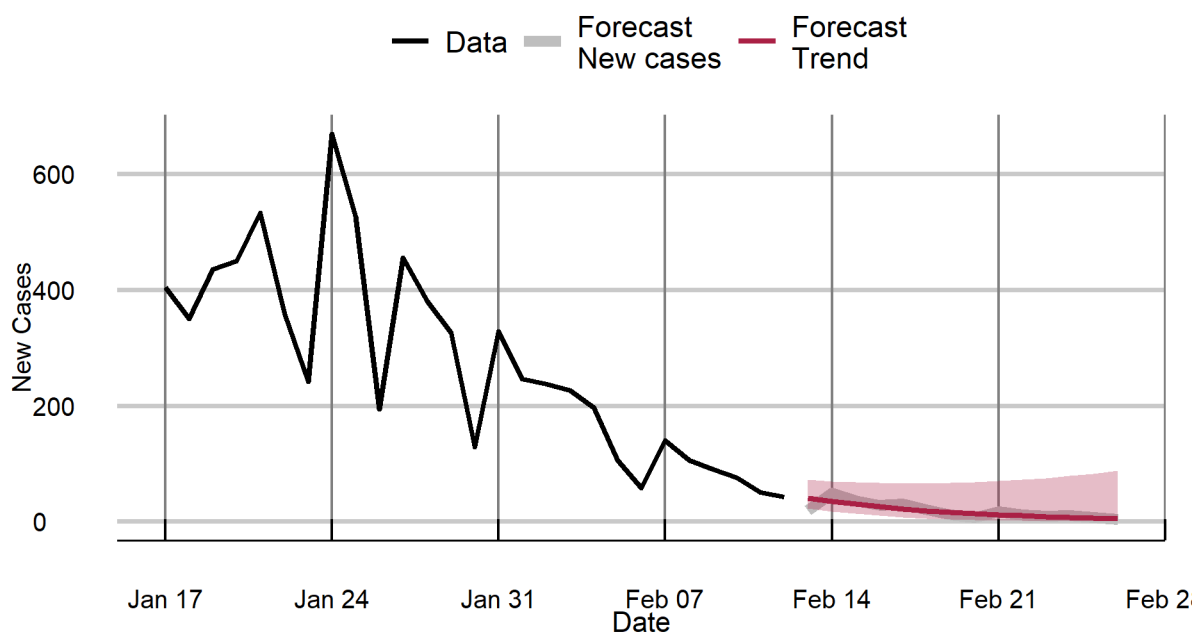
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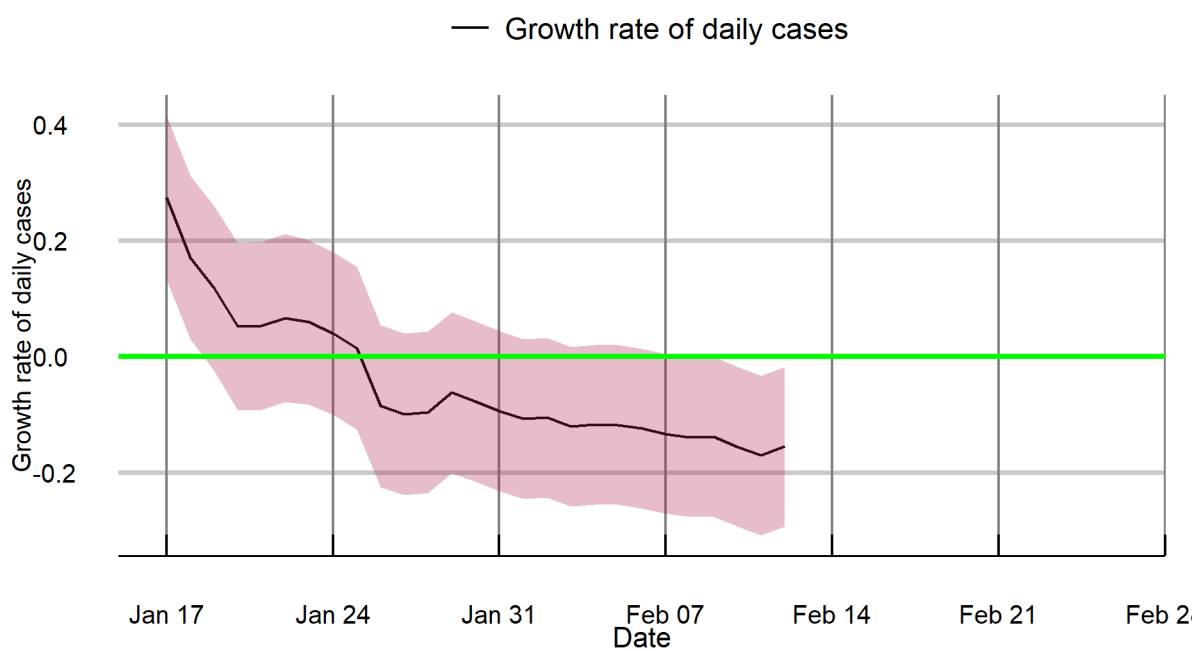
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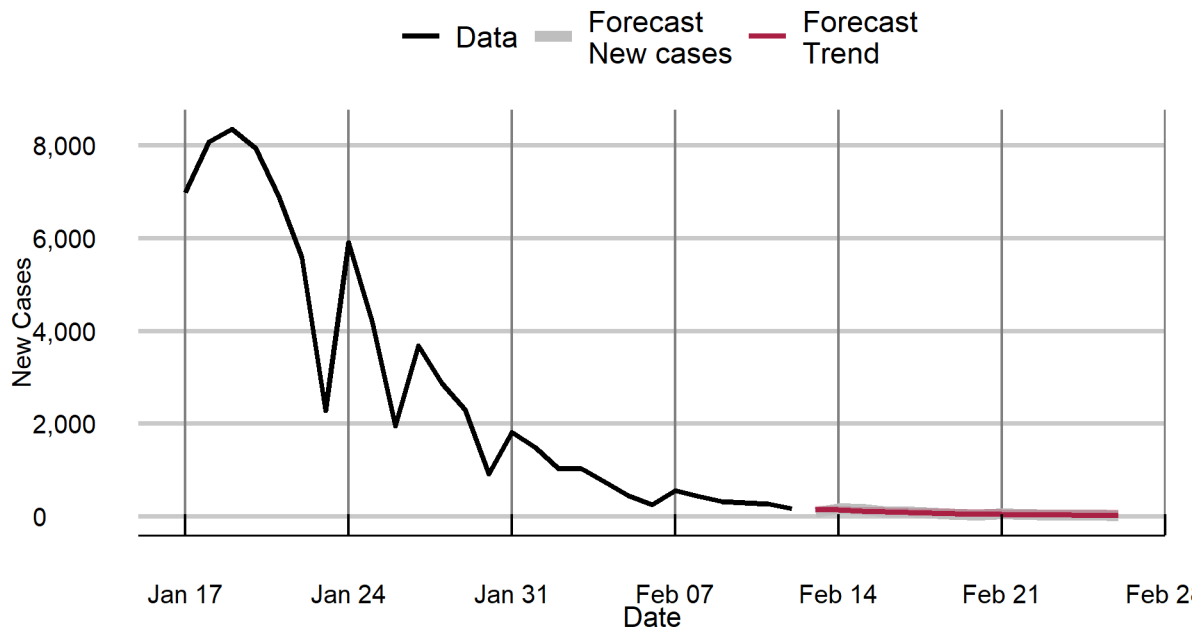
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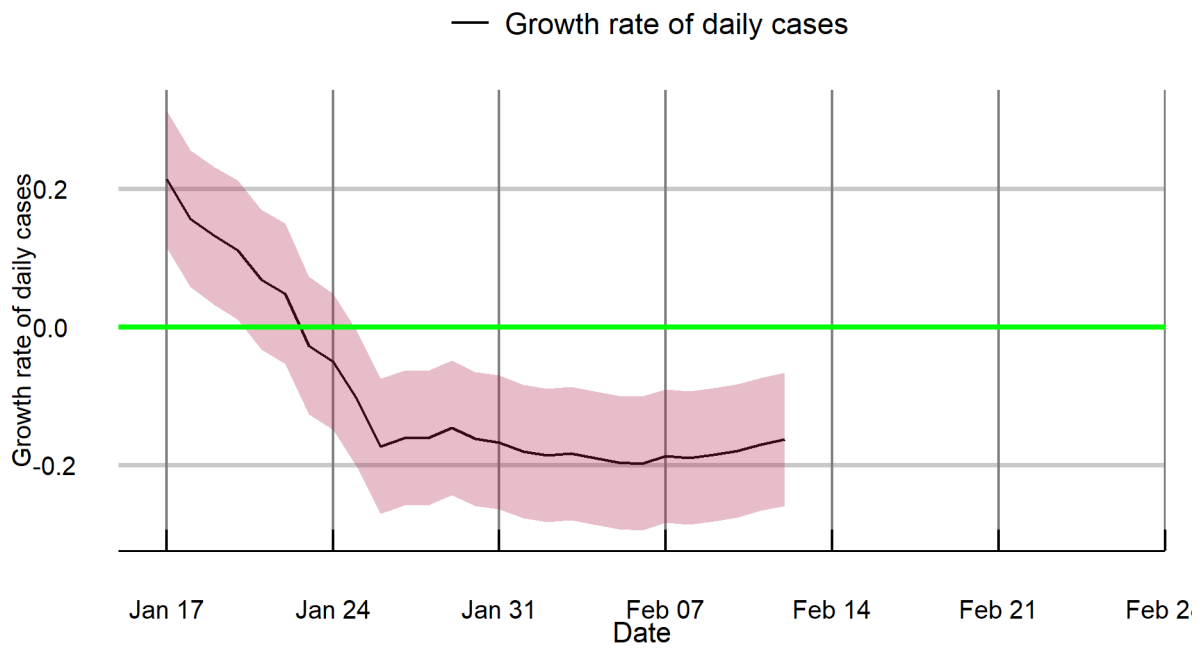
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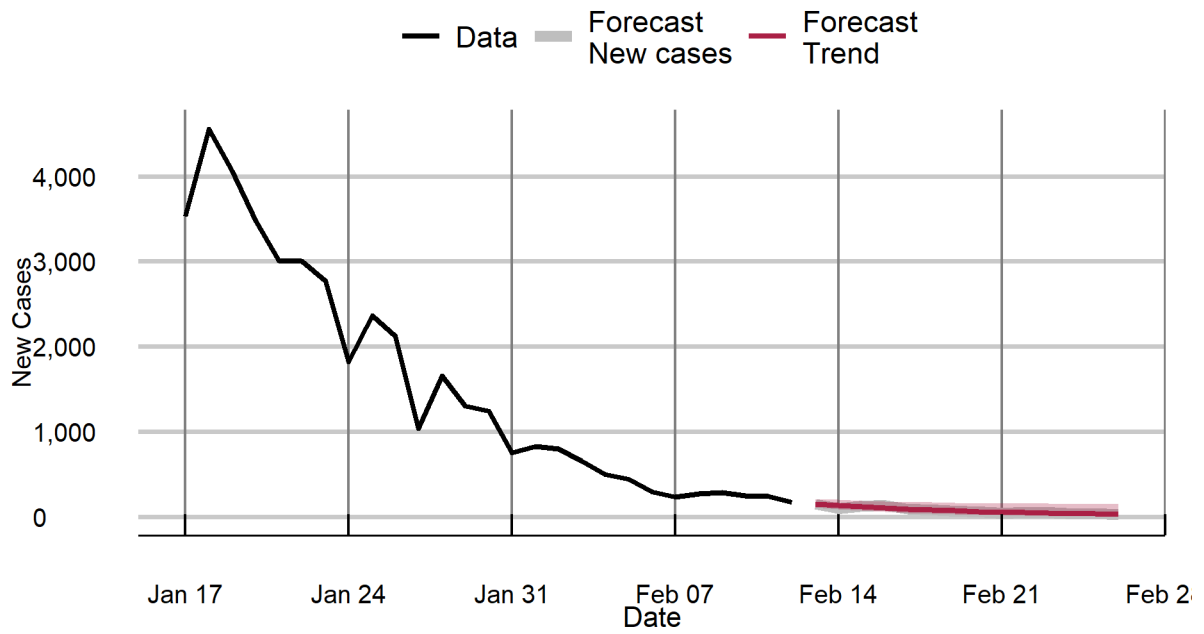
Assam



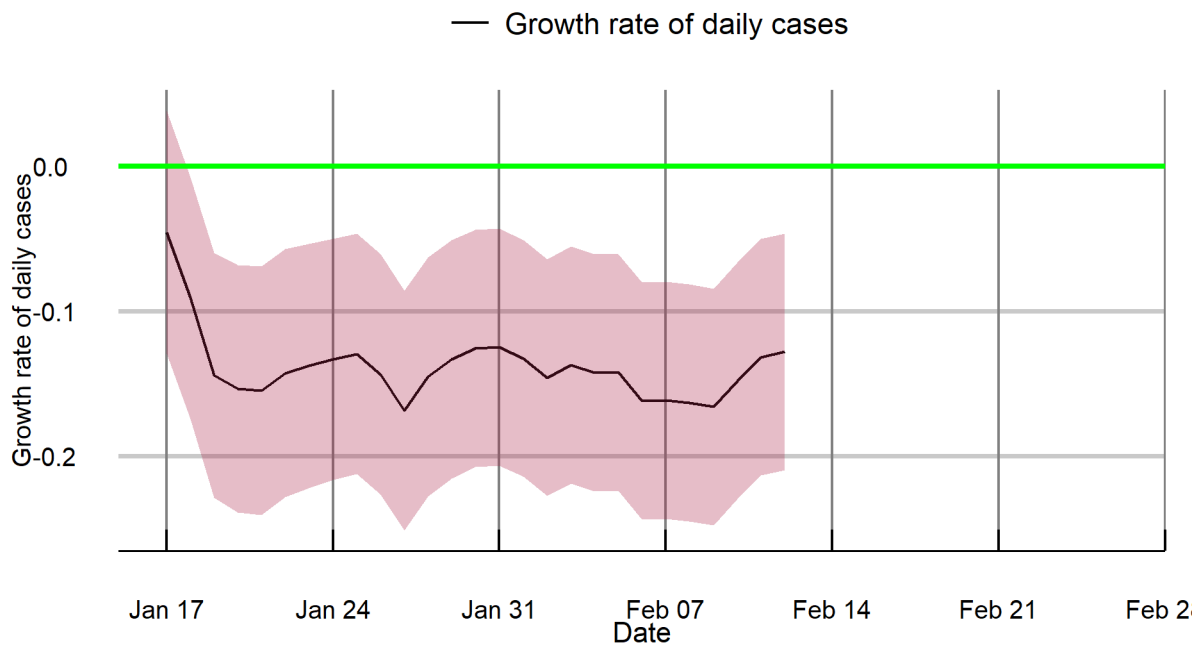
Assam



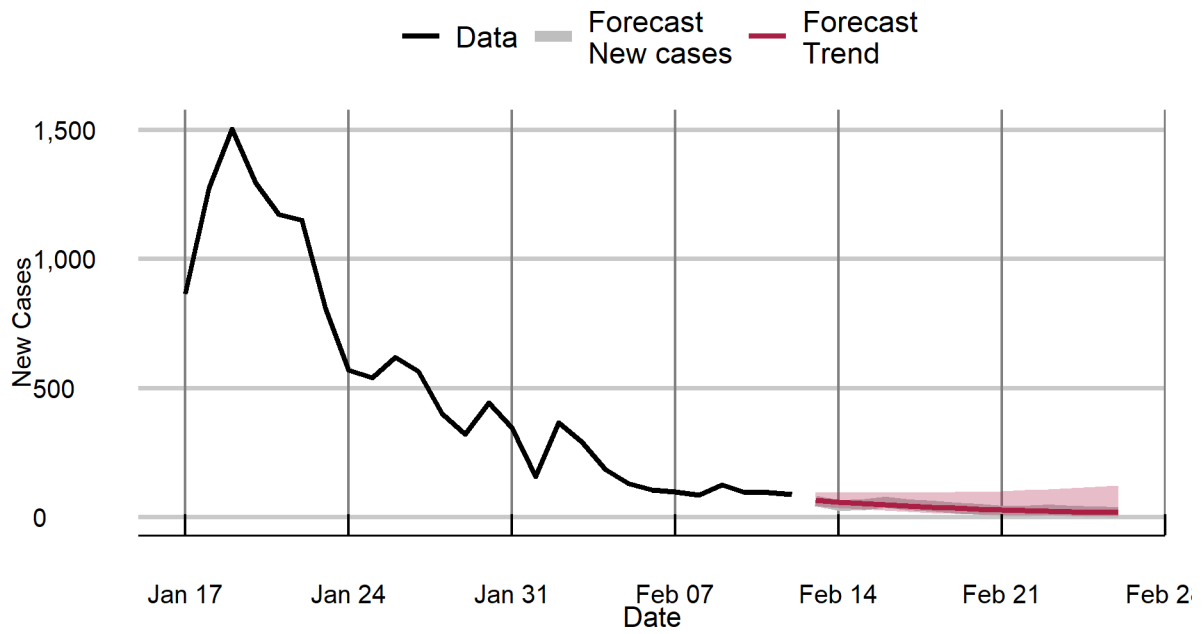
Bihar



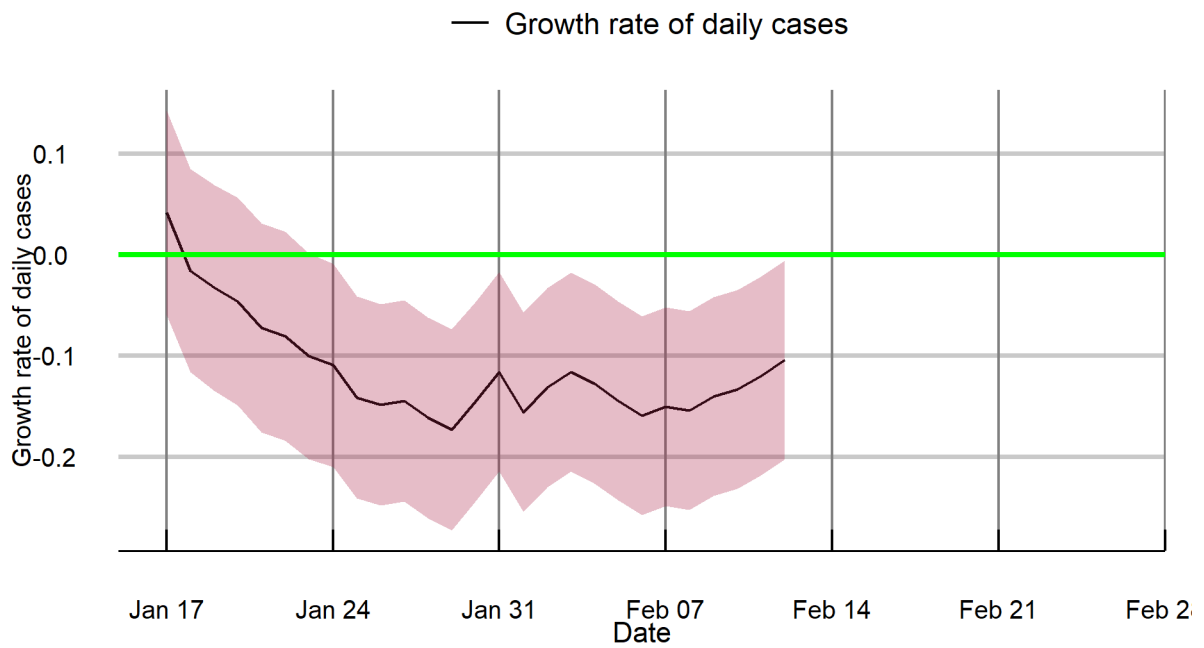
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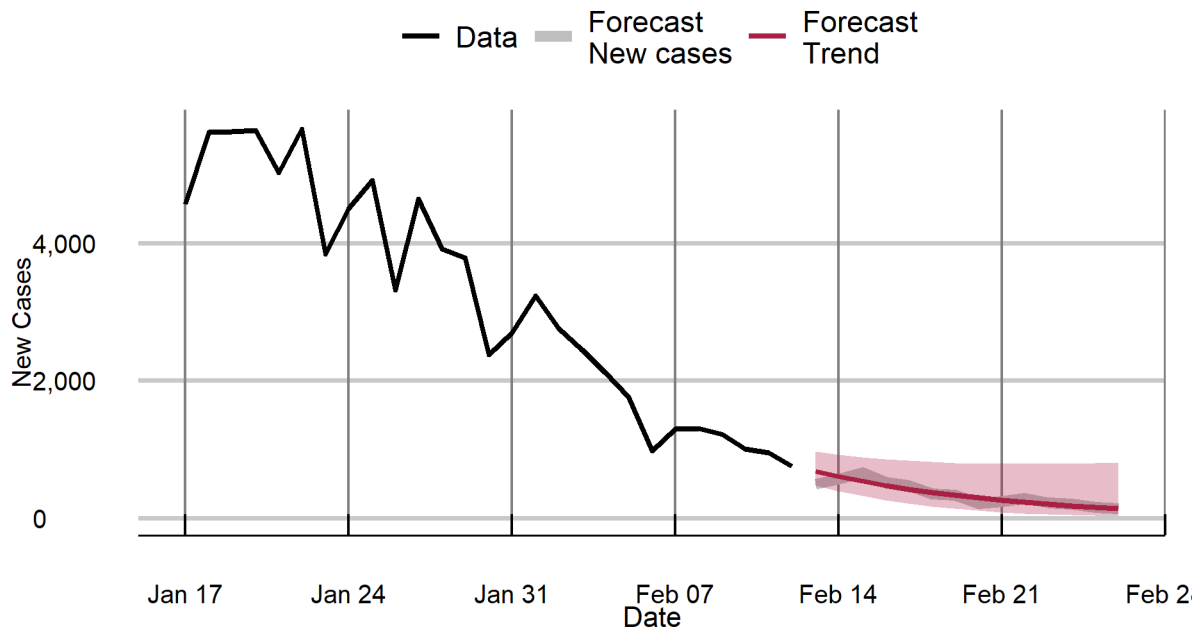
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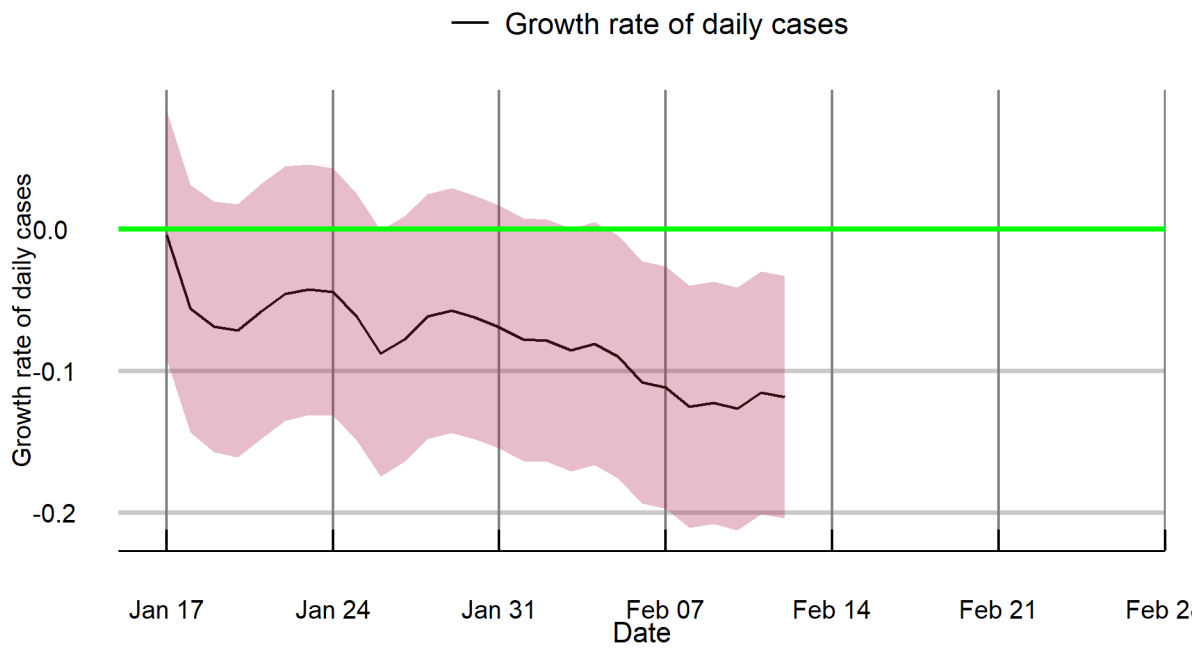
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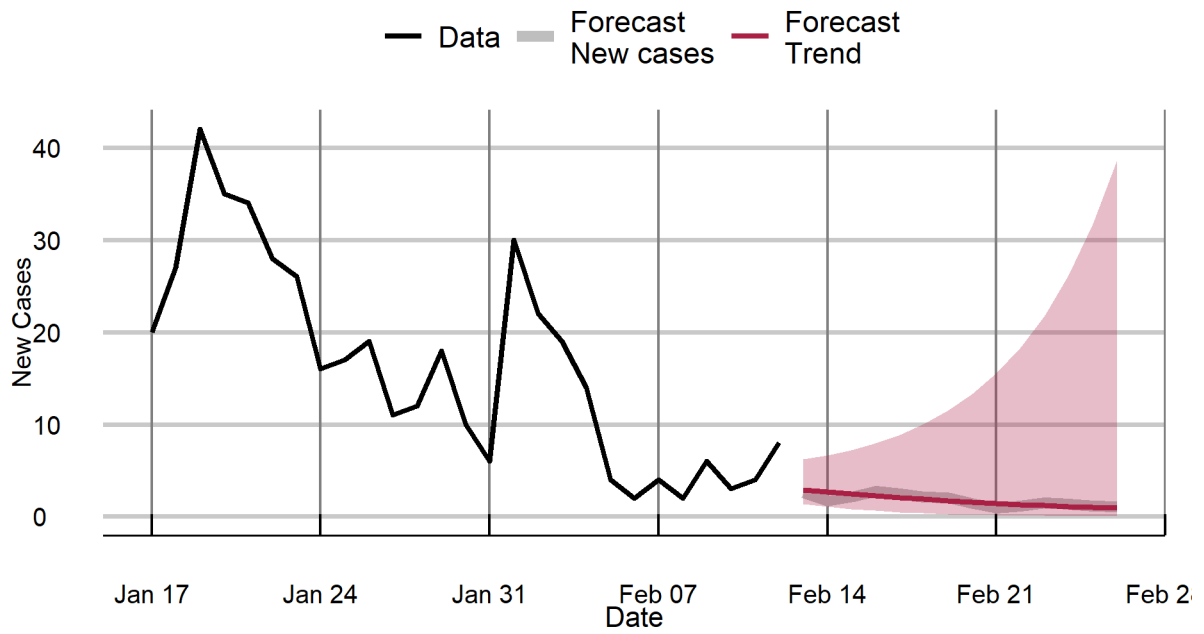
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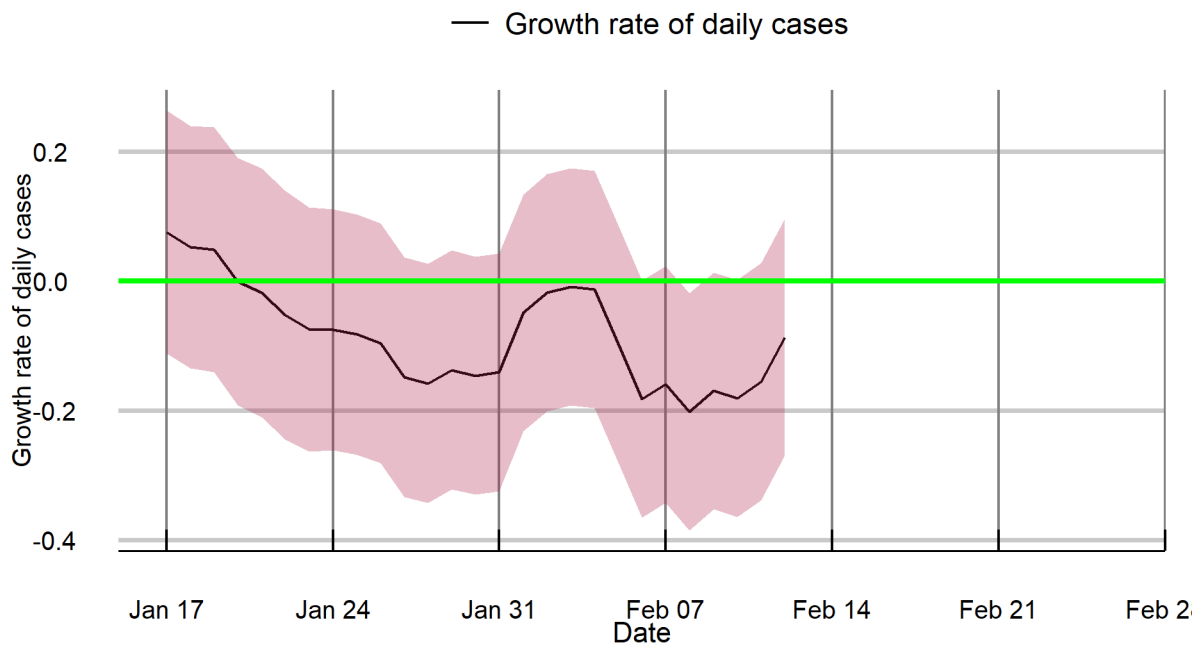
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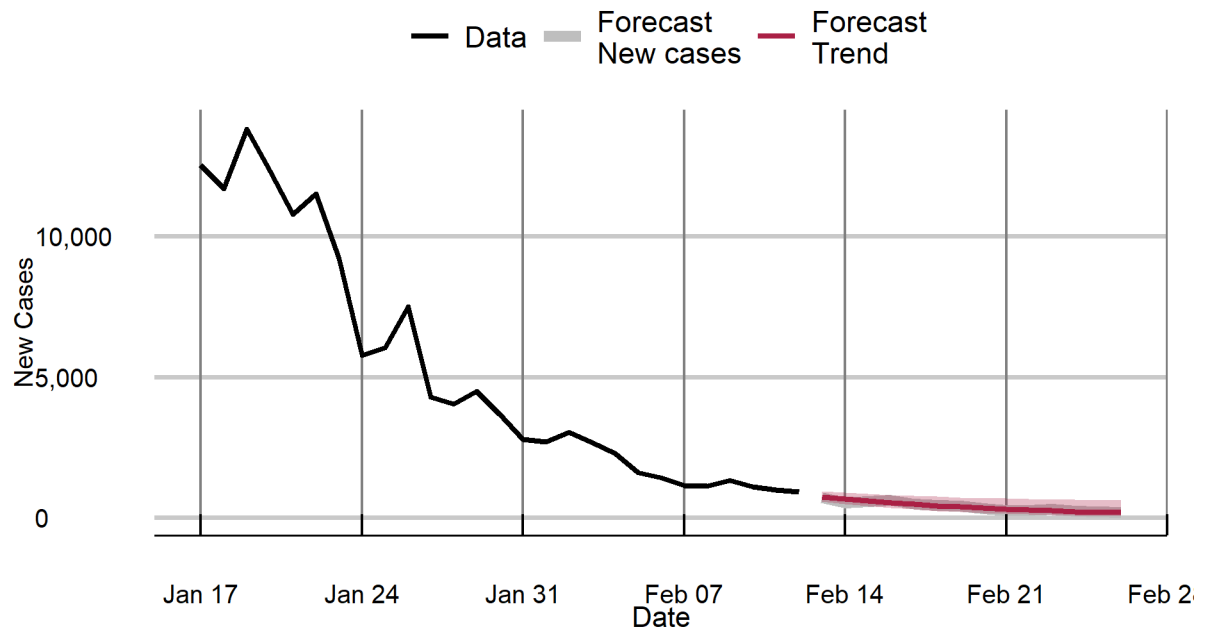
D & N H



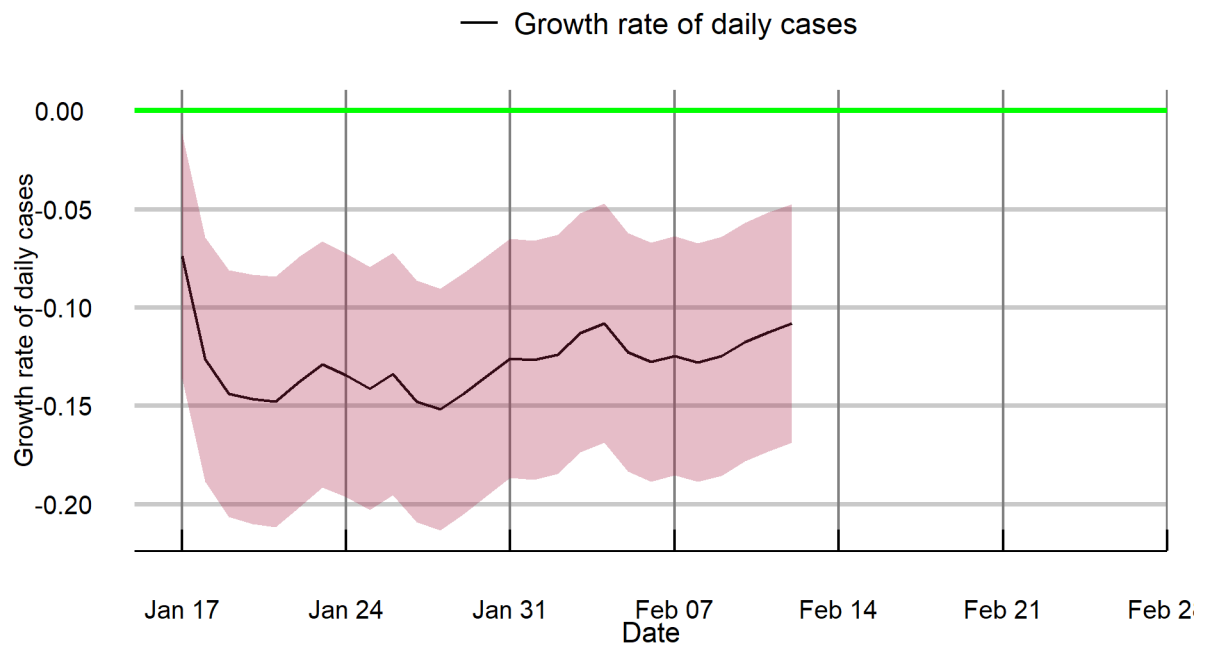
D & N H



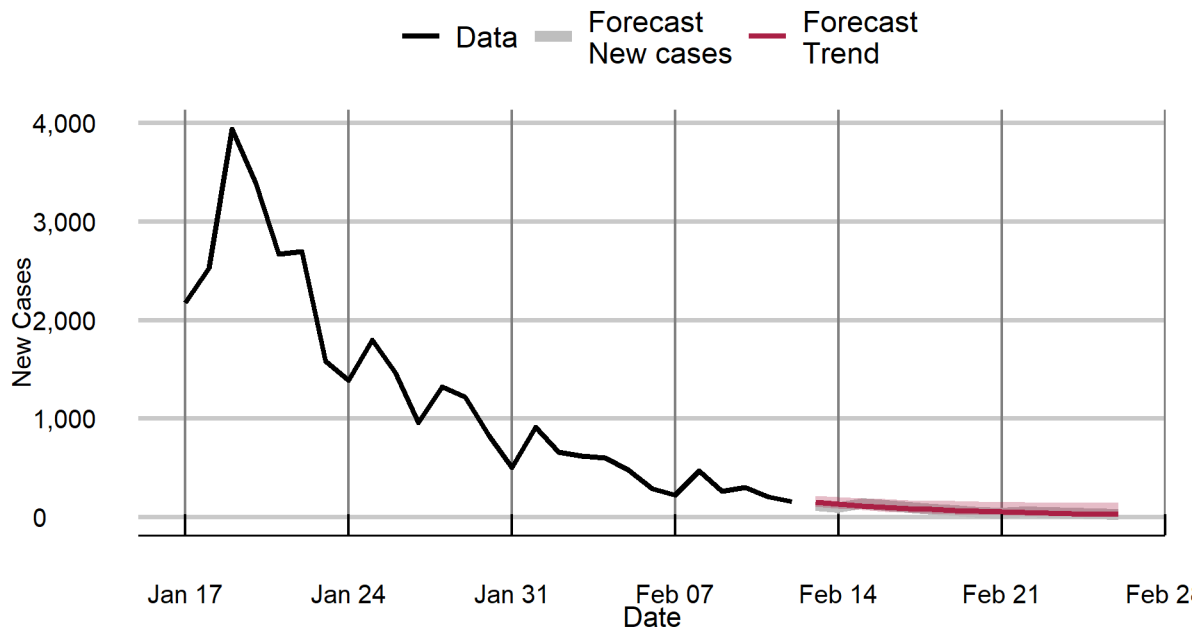
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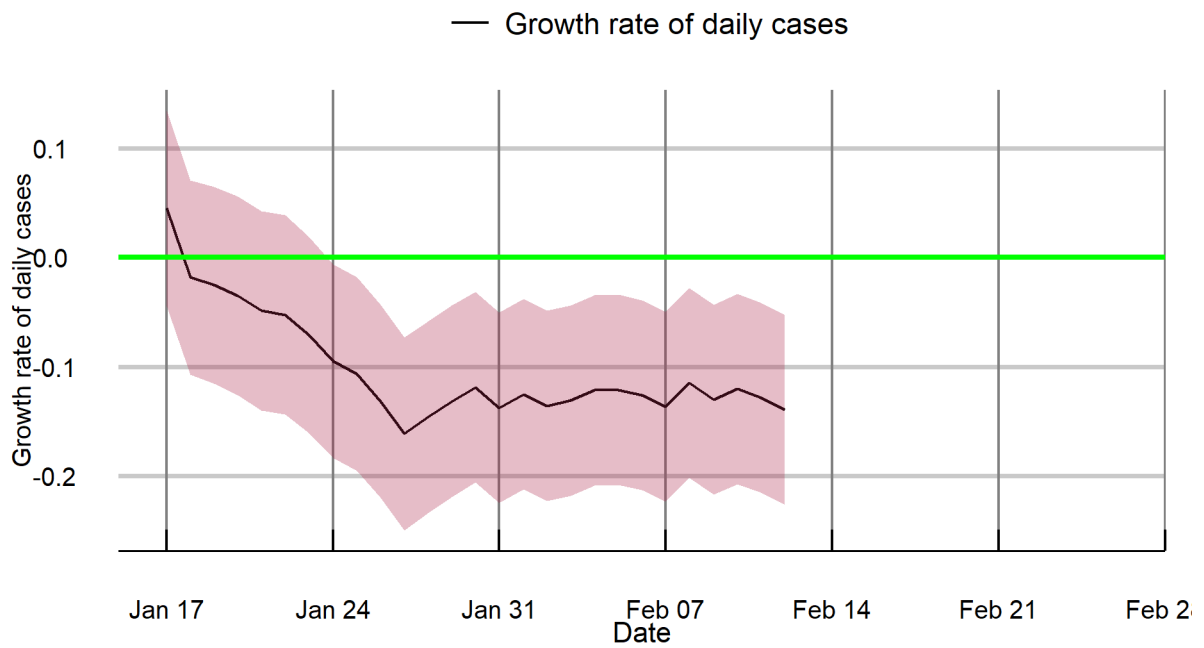
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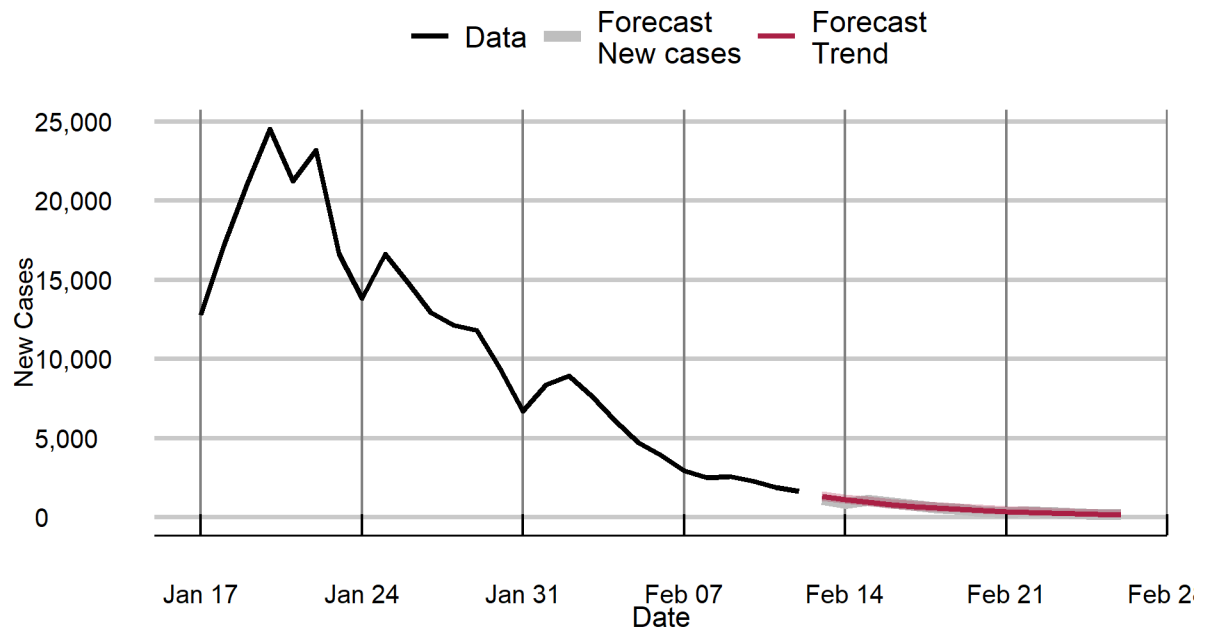
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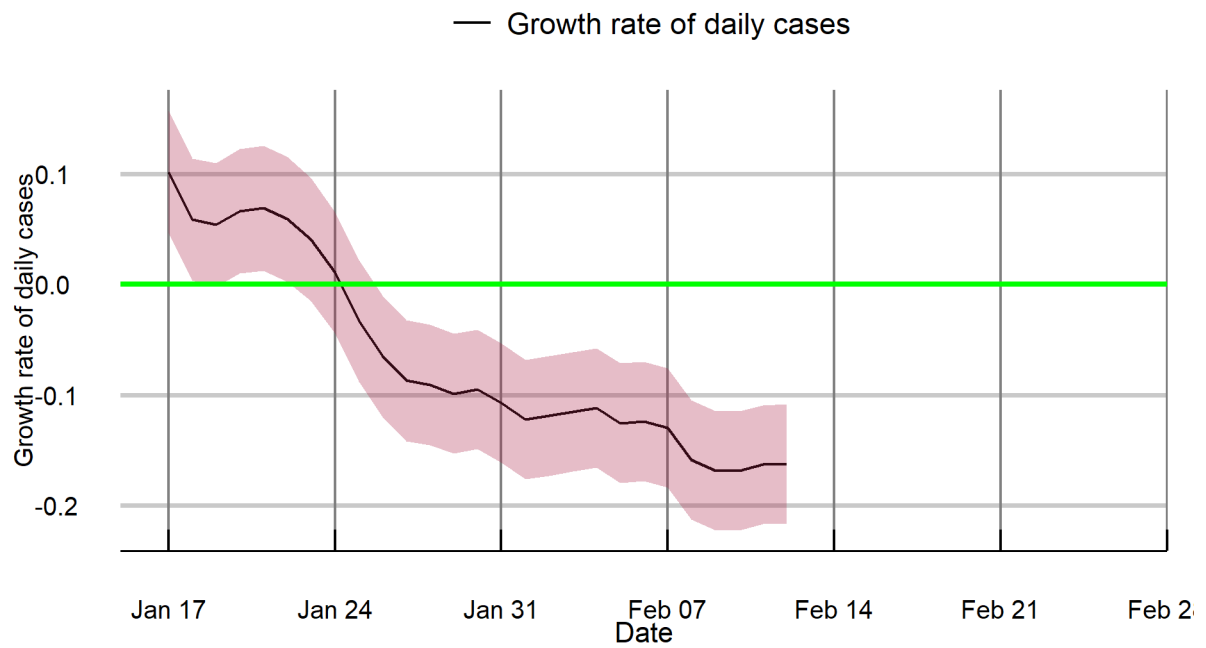
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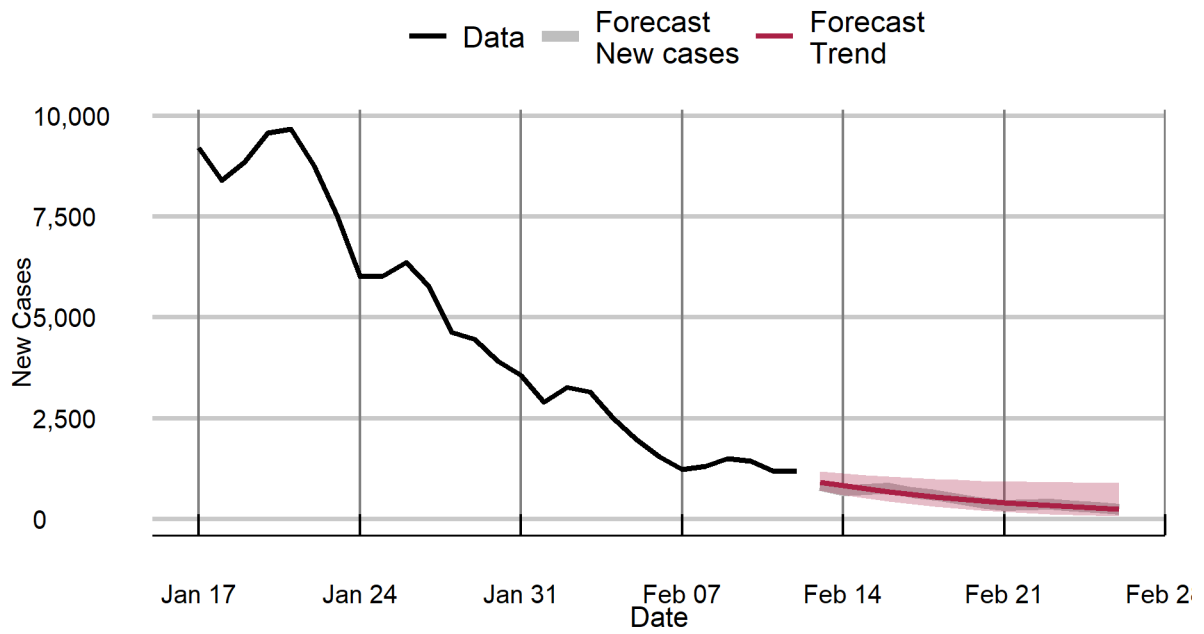
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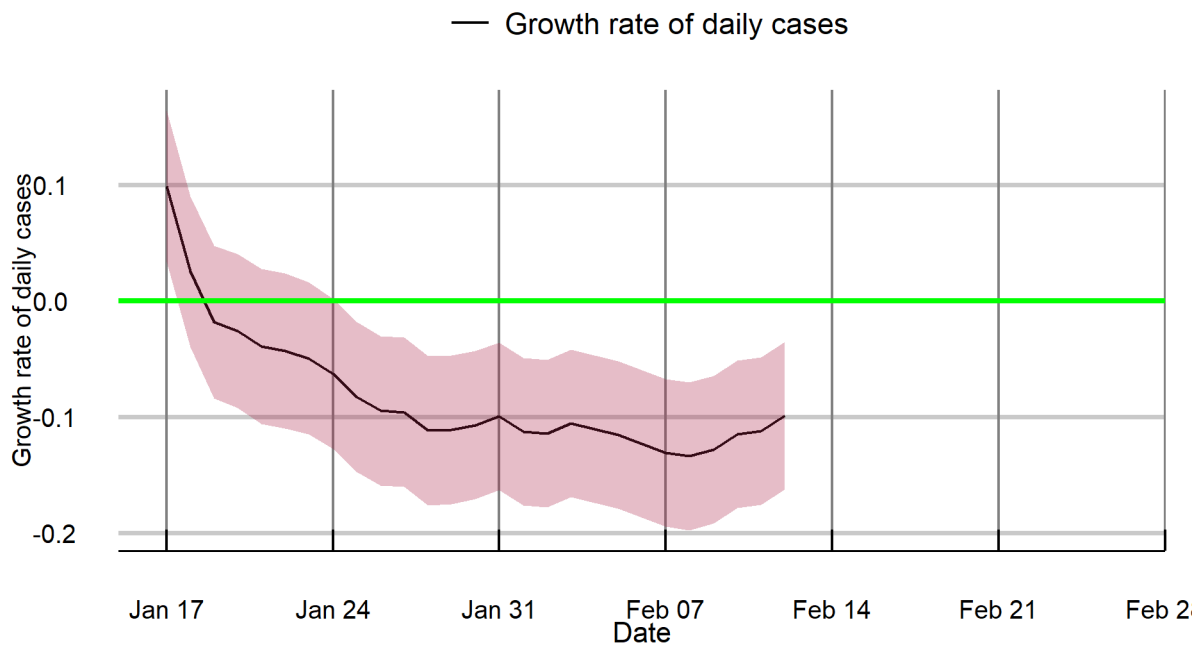
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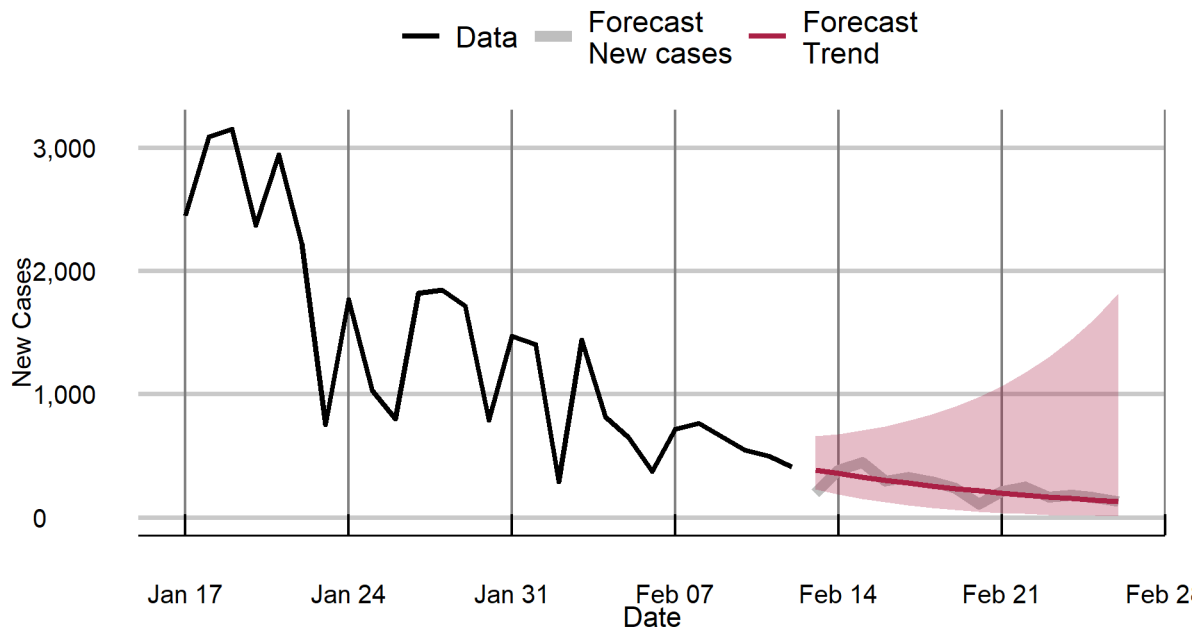
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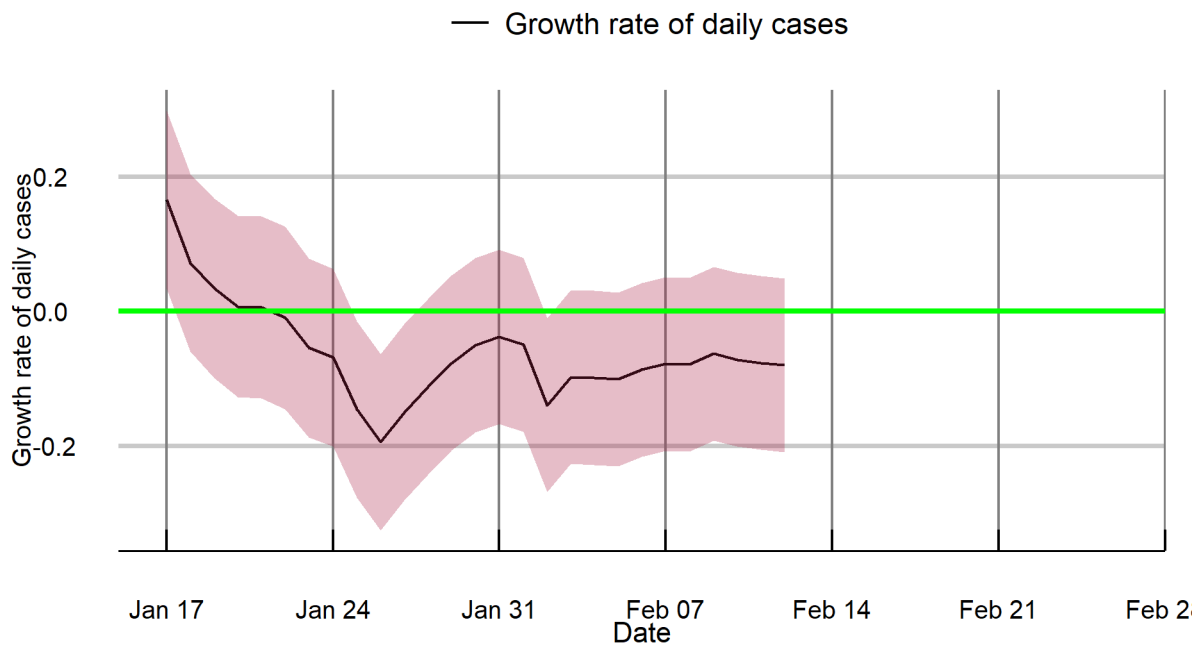
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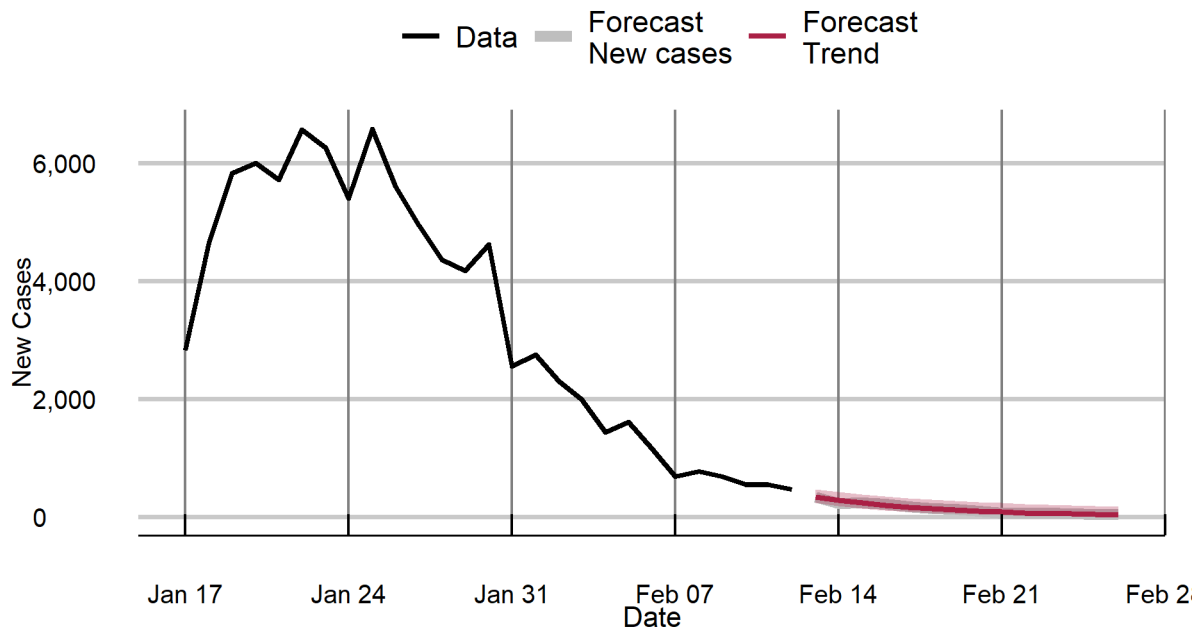
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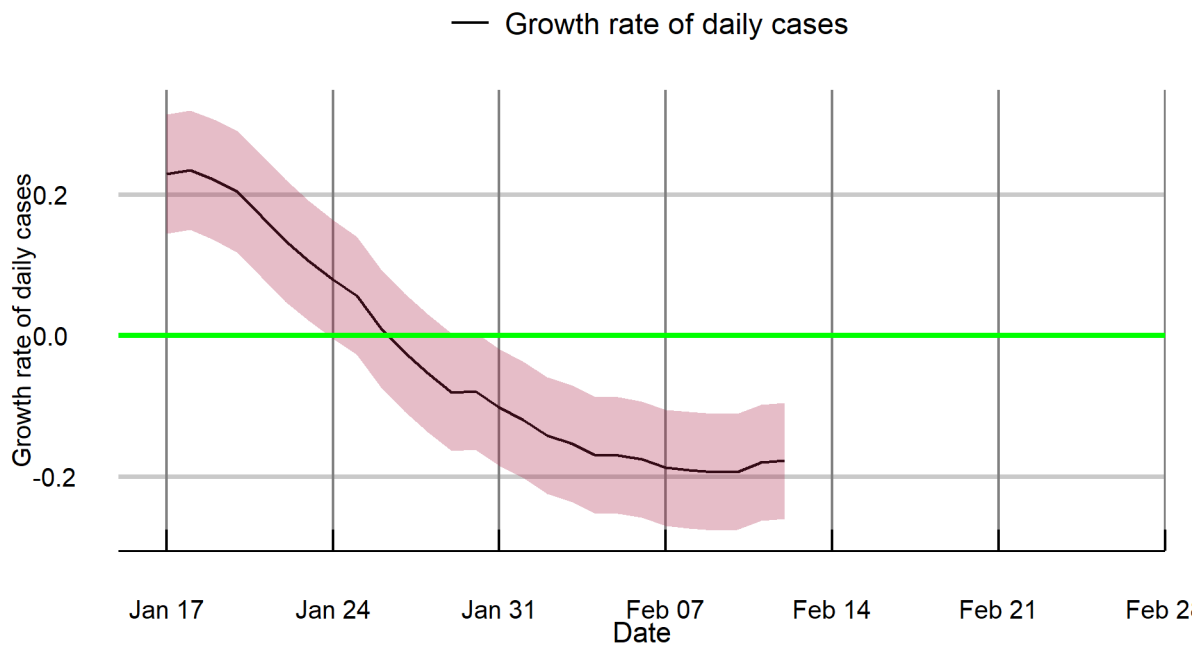
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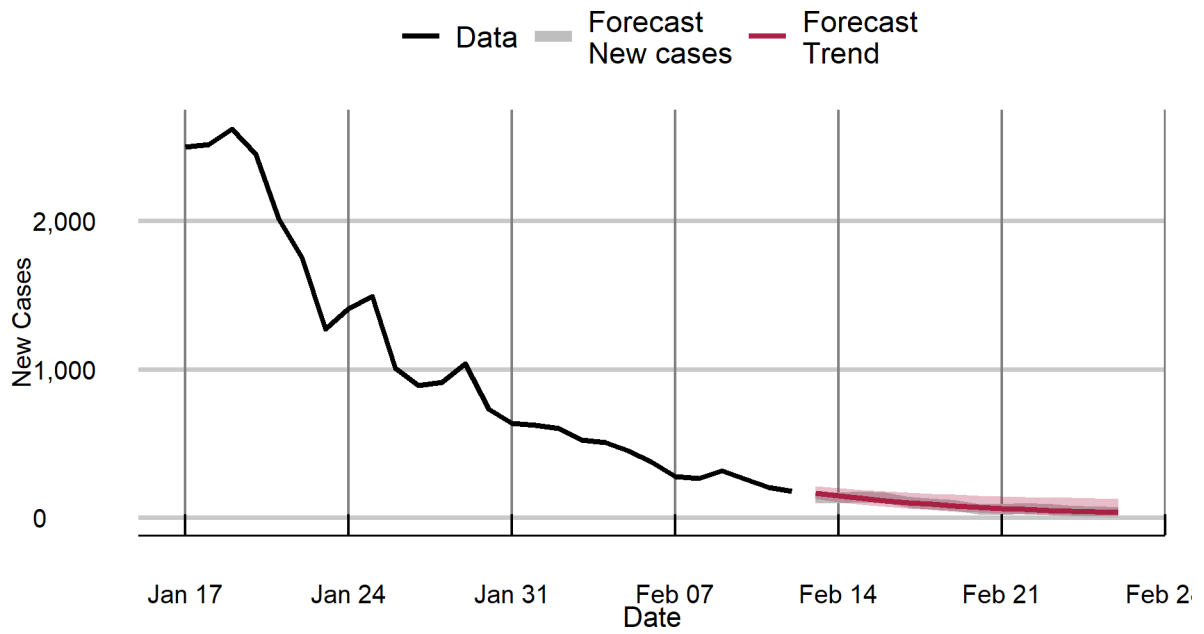
Jammu & Kashmir



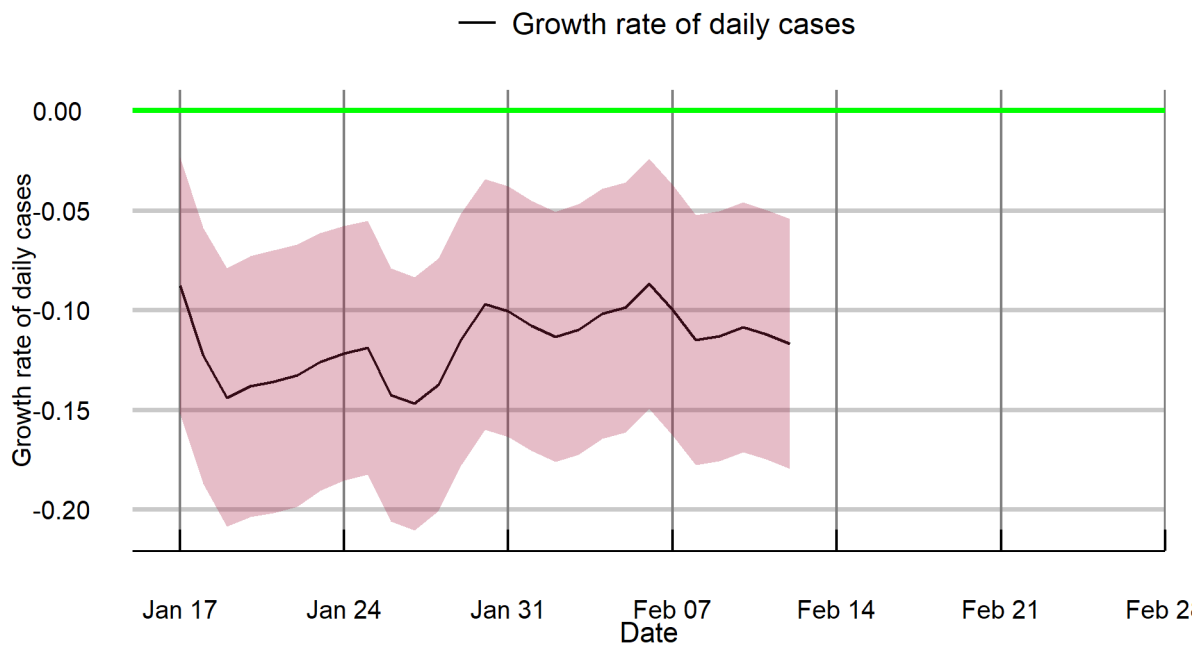
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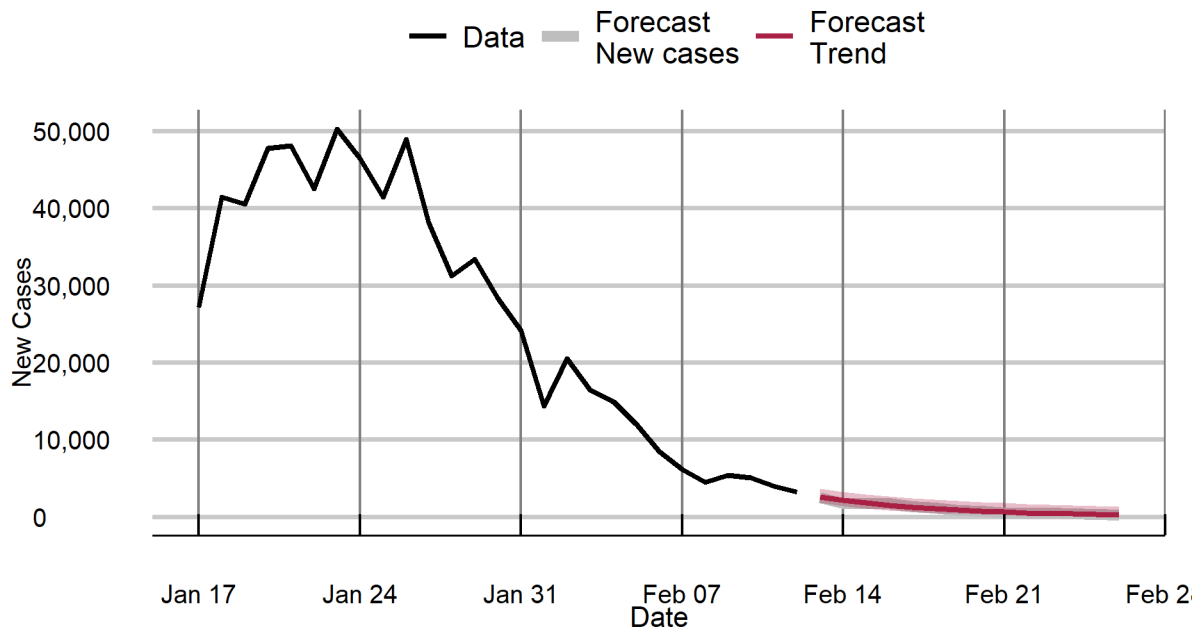
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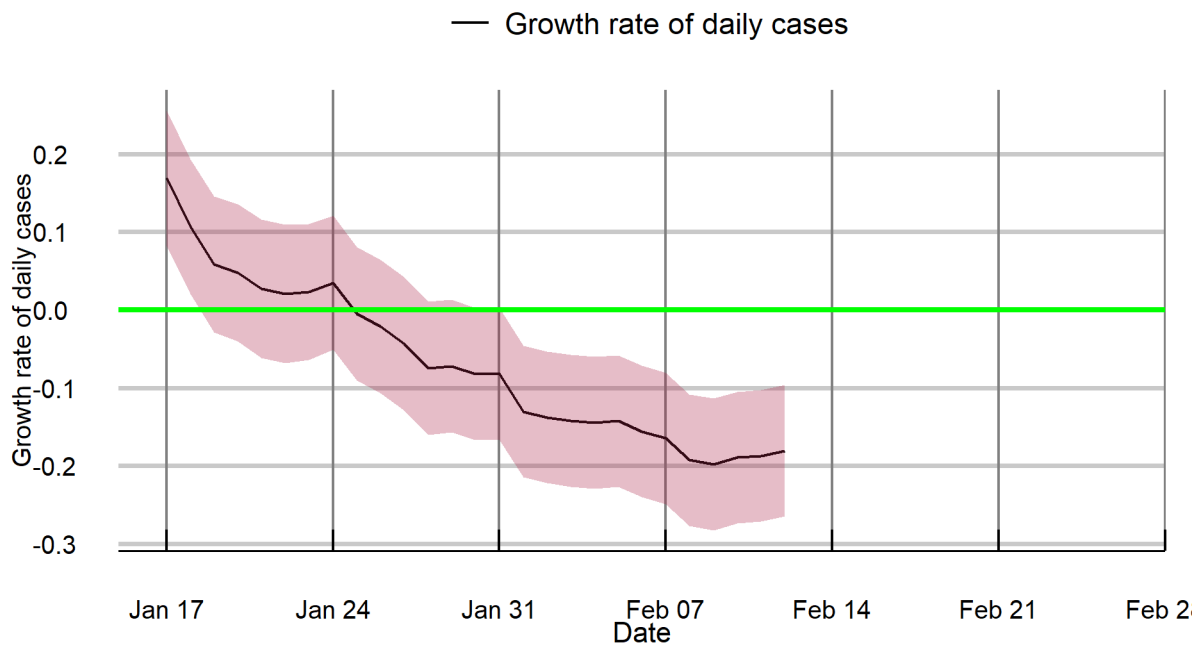
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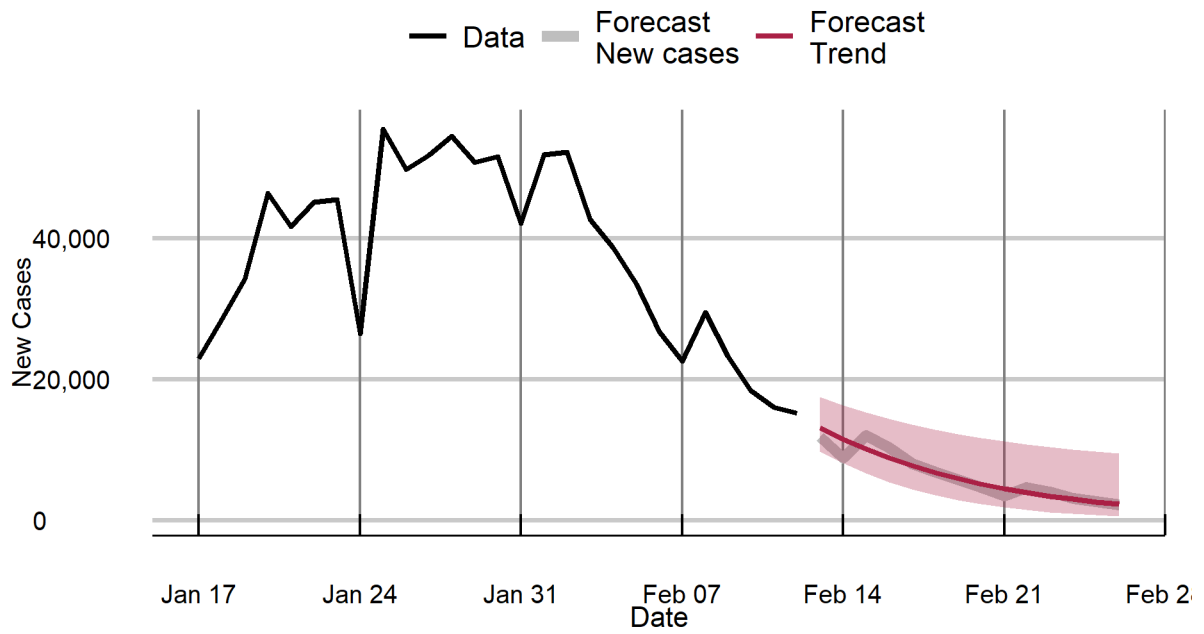
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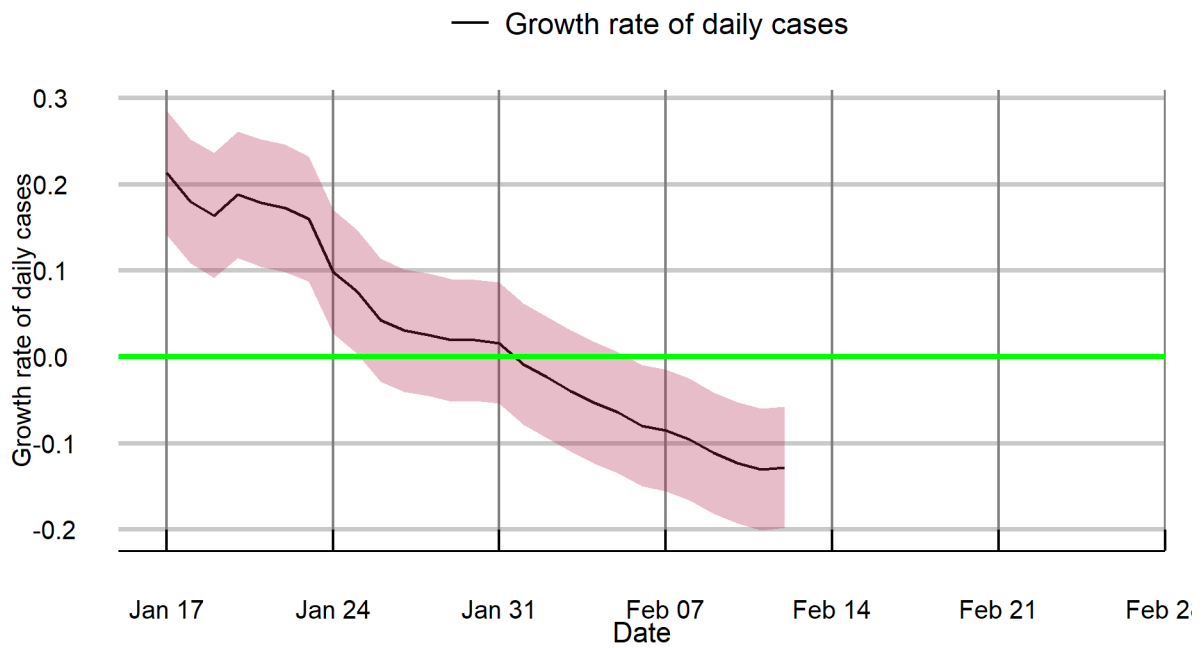
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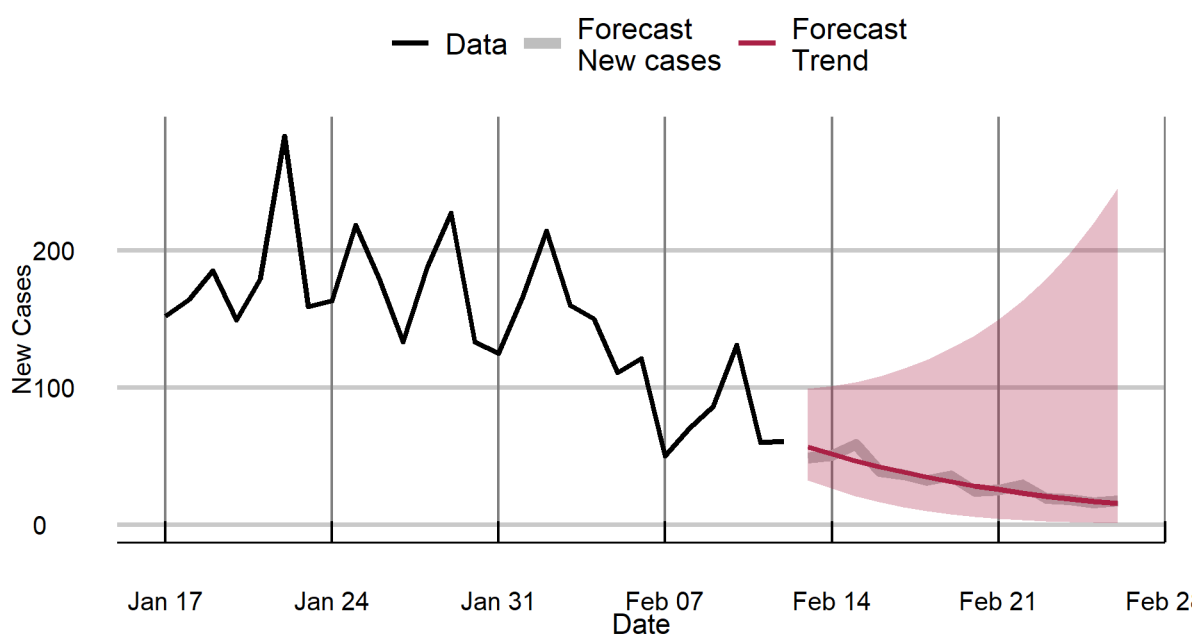
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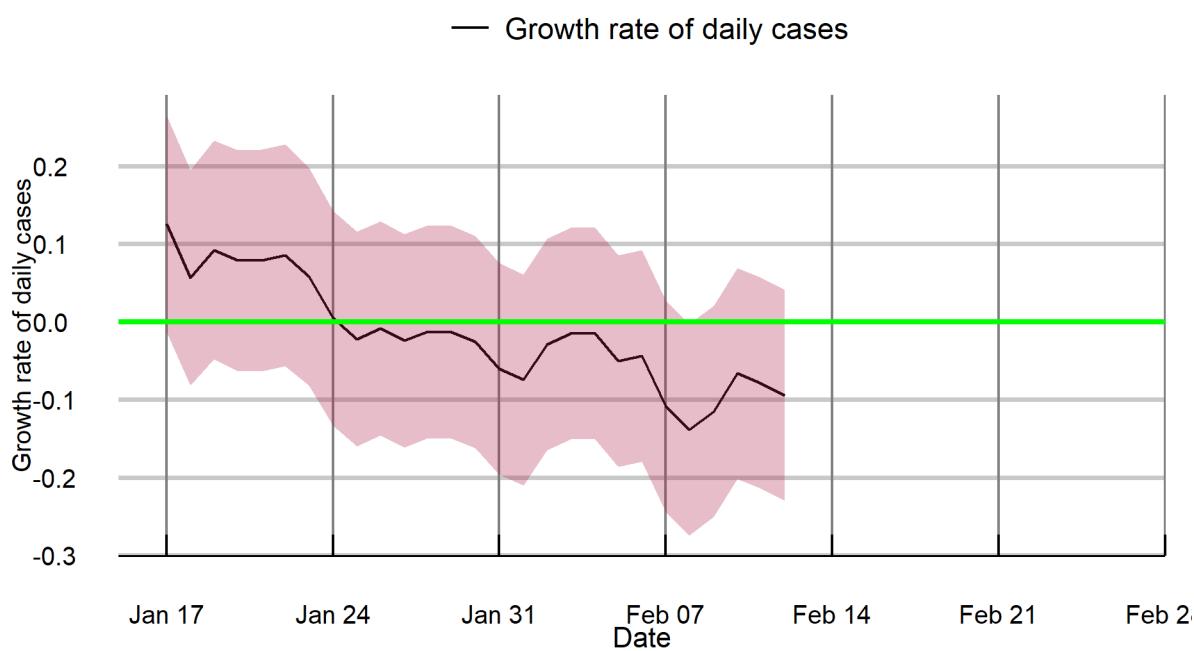
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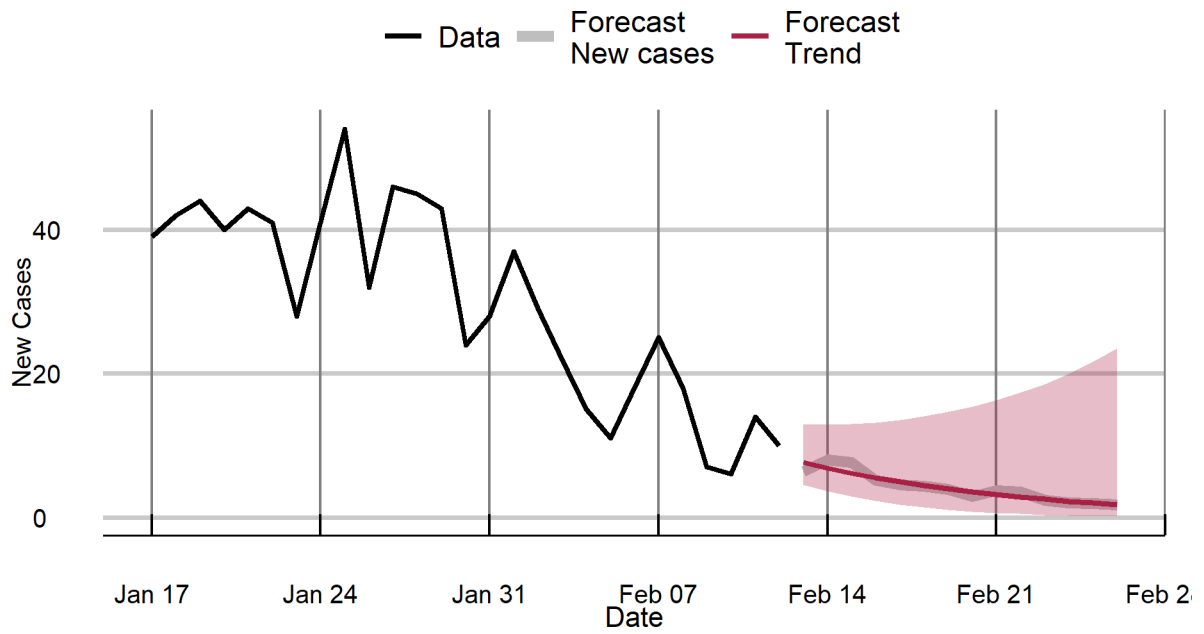
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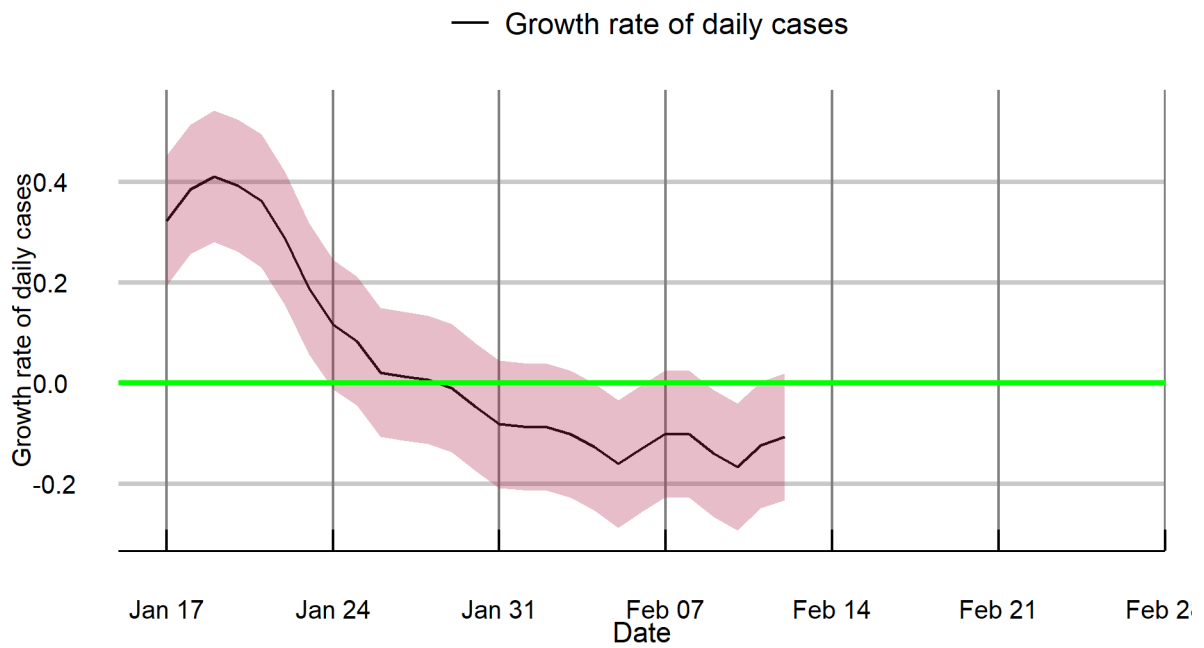
Ladakh



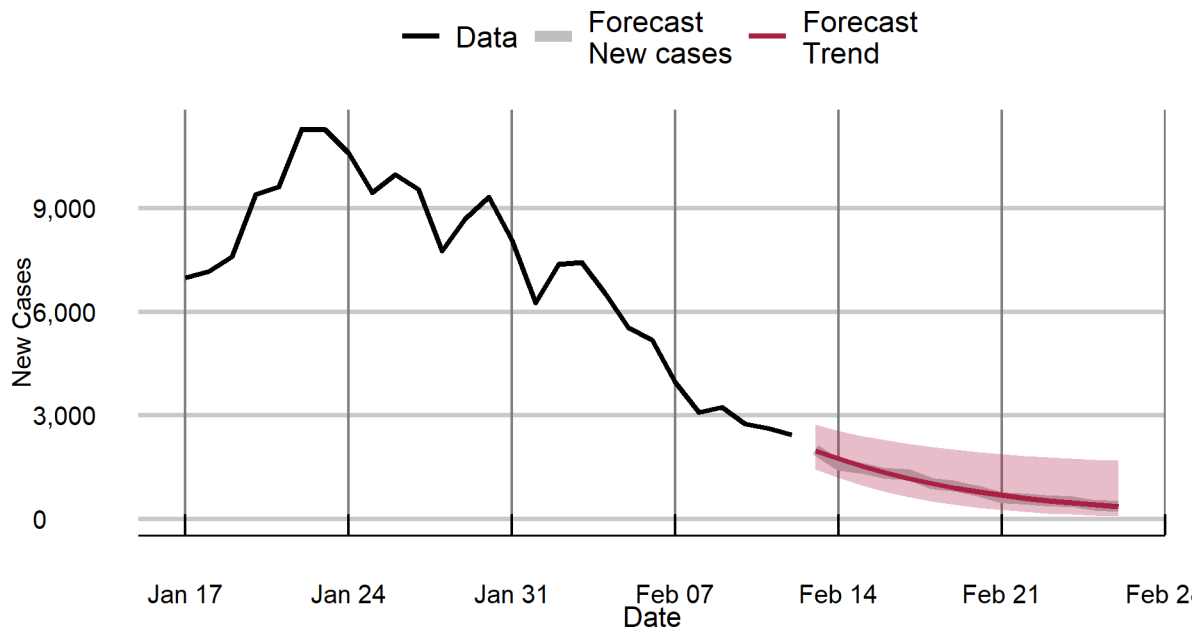
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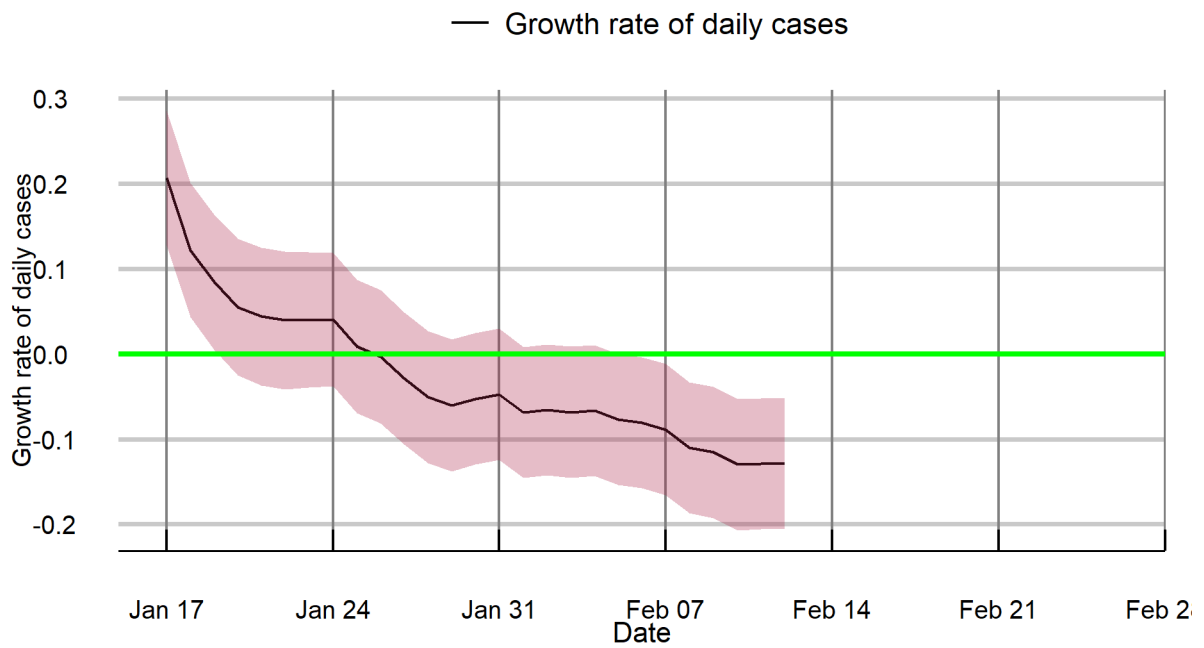
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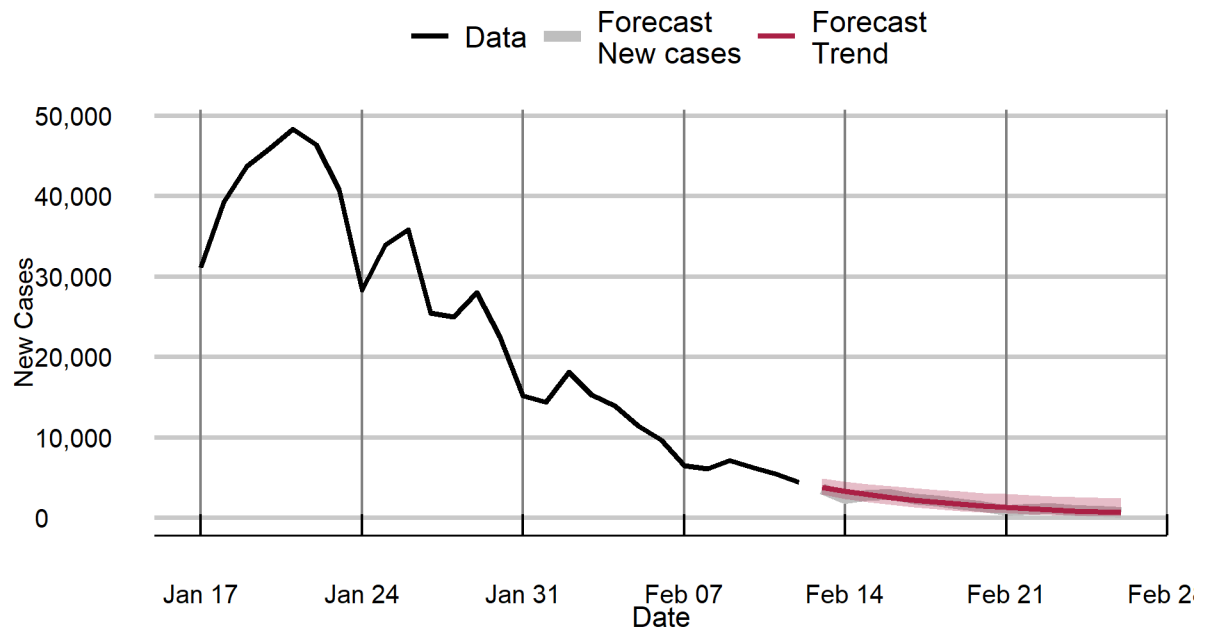
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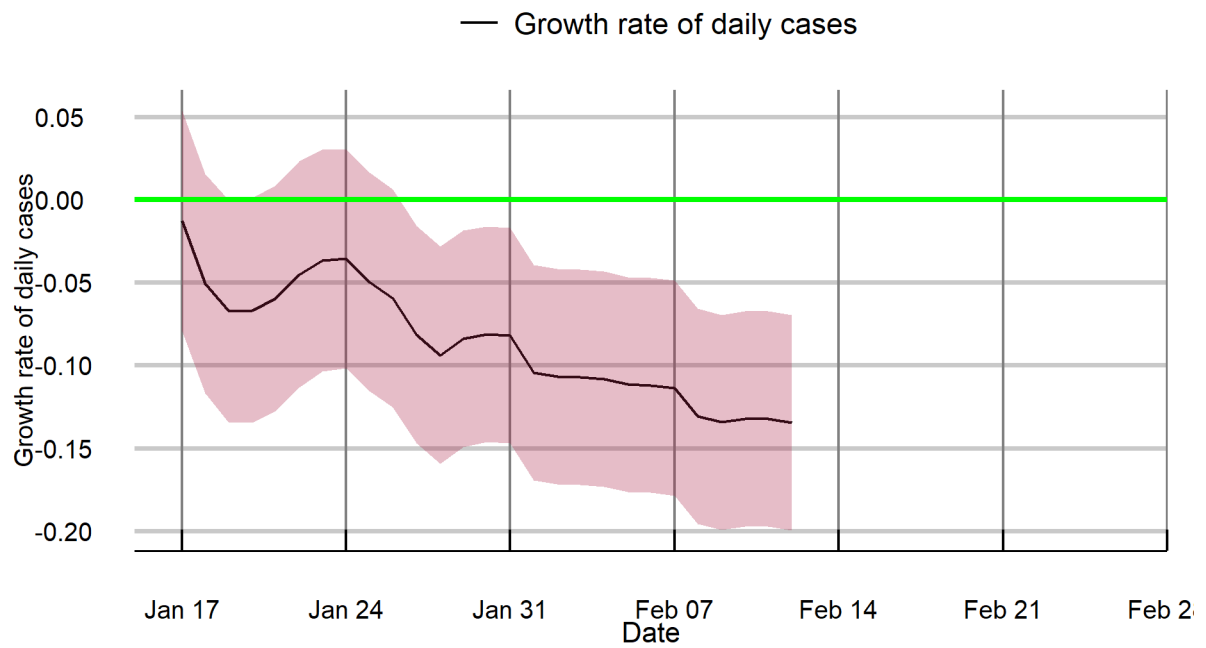
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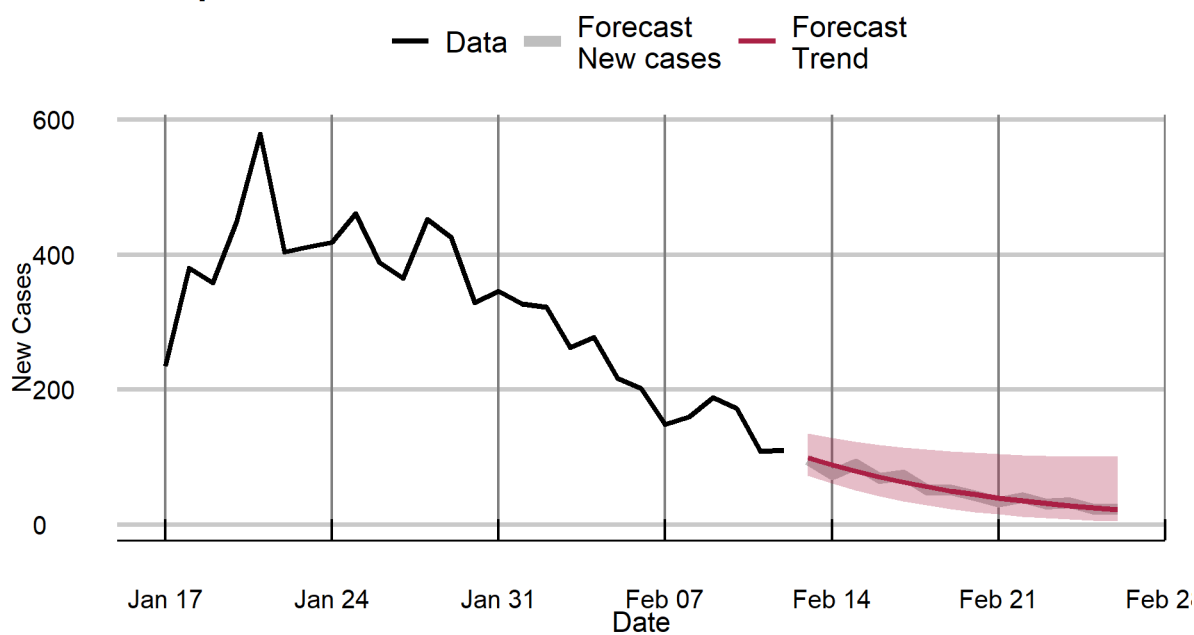
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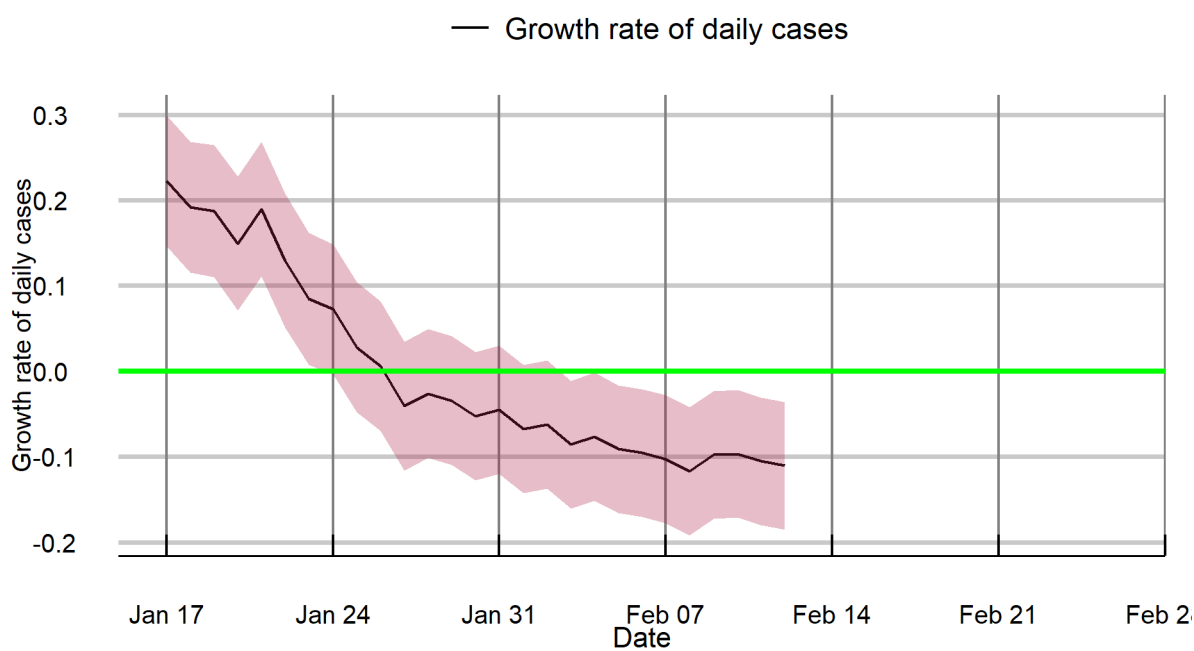
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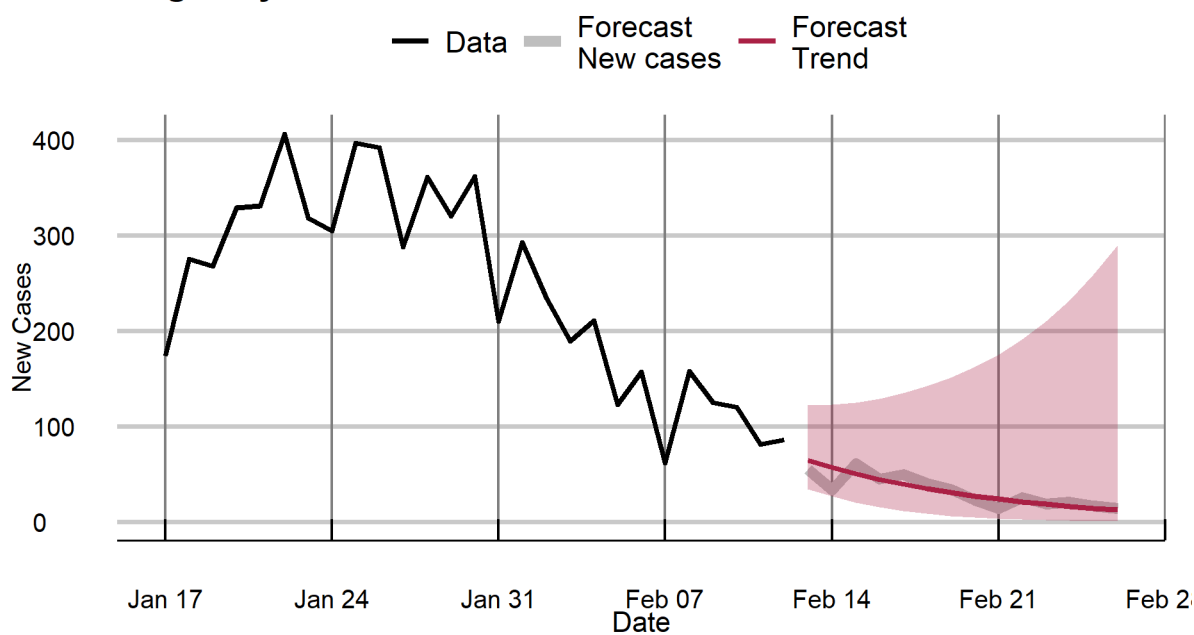
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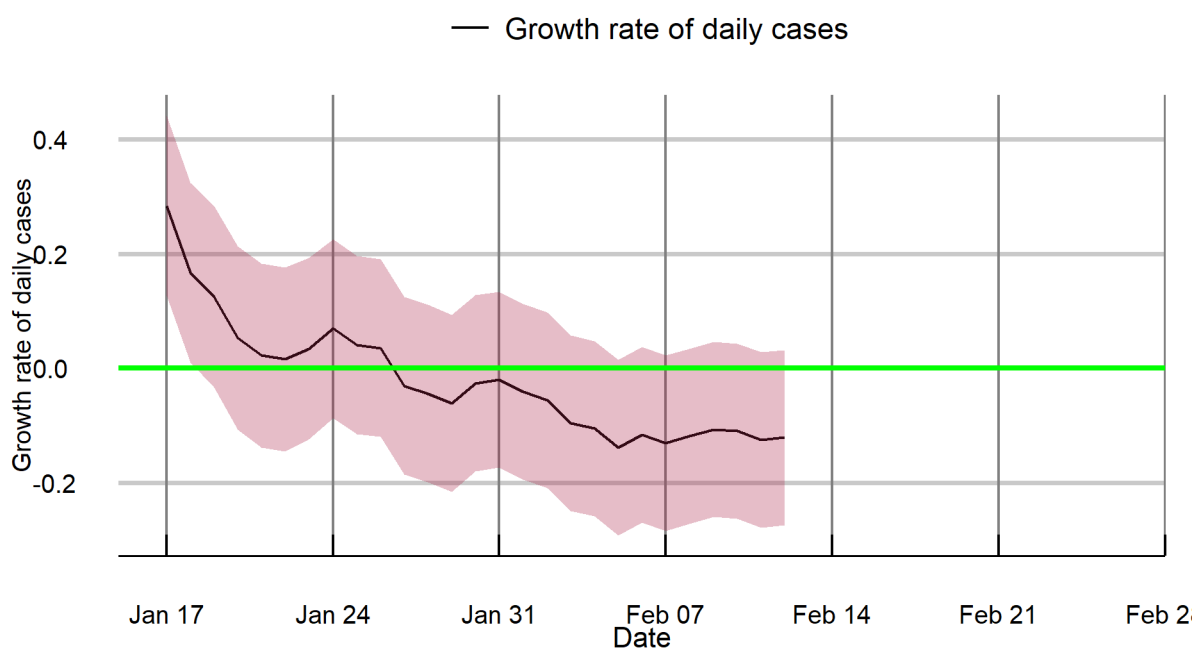
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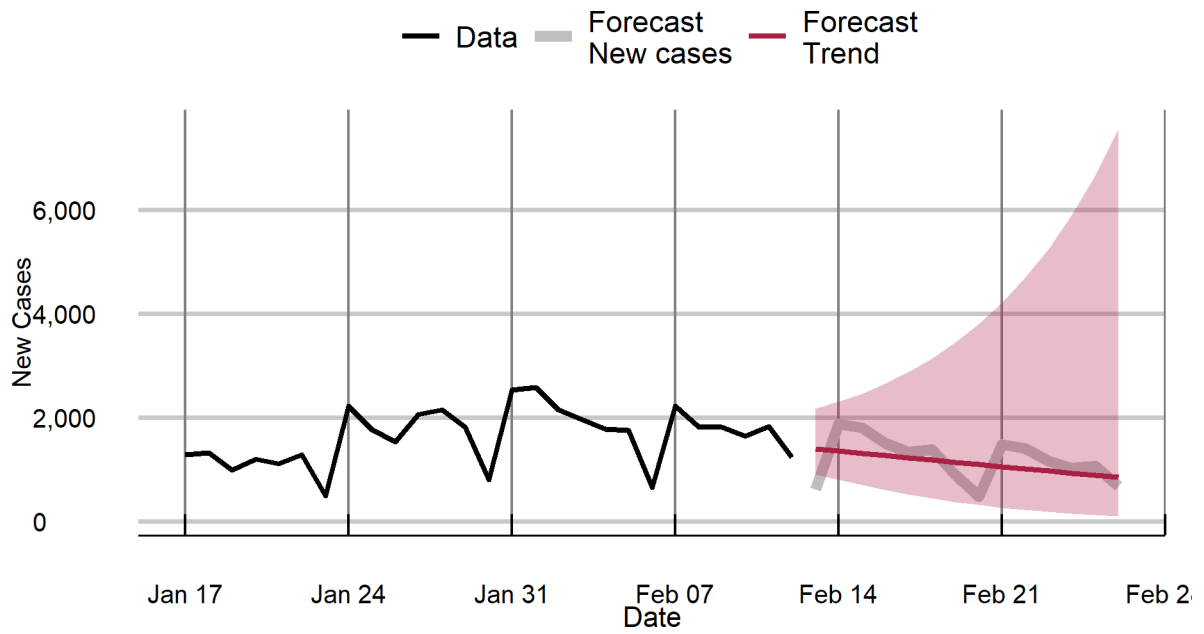
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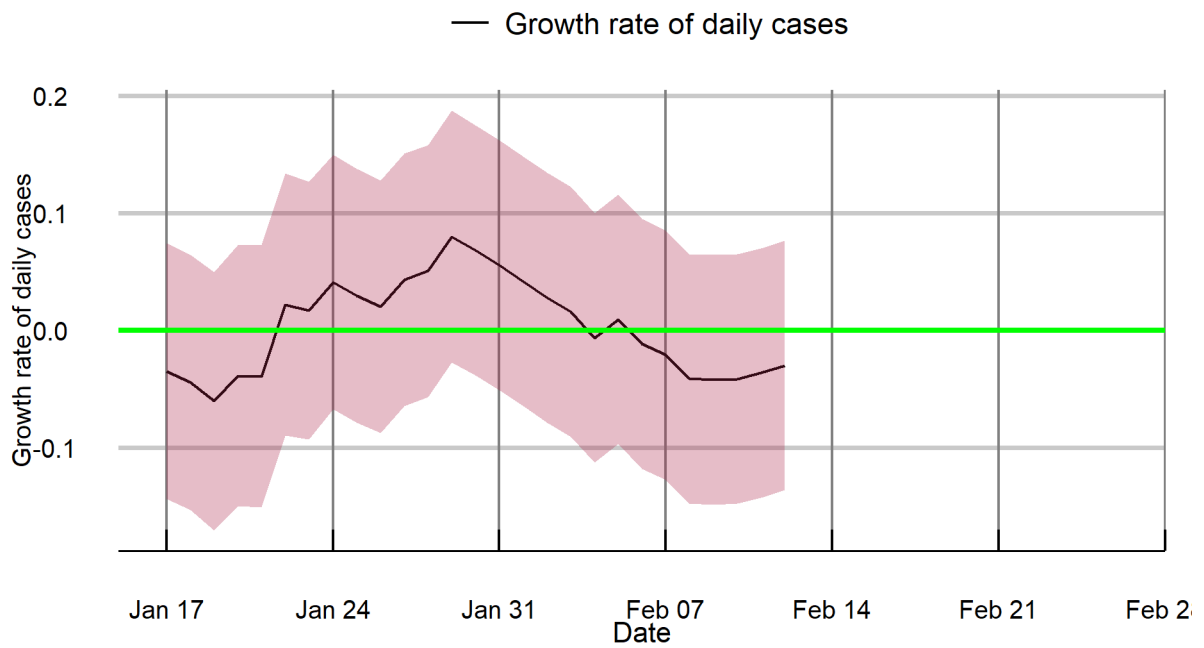
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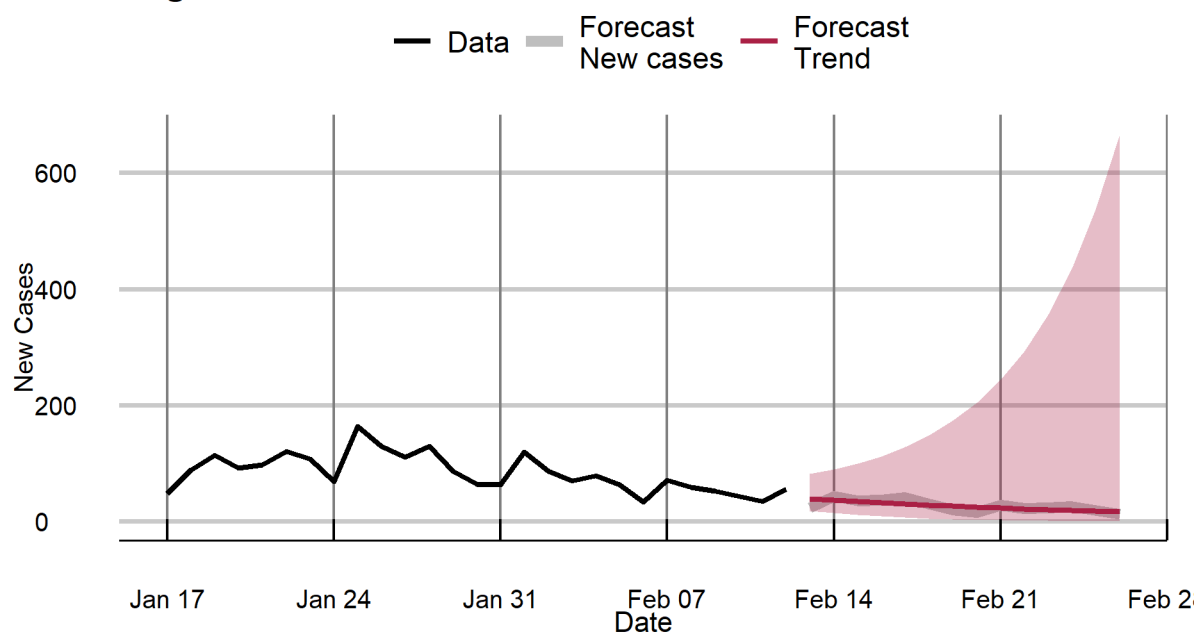
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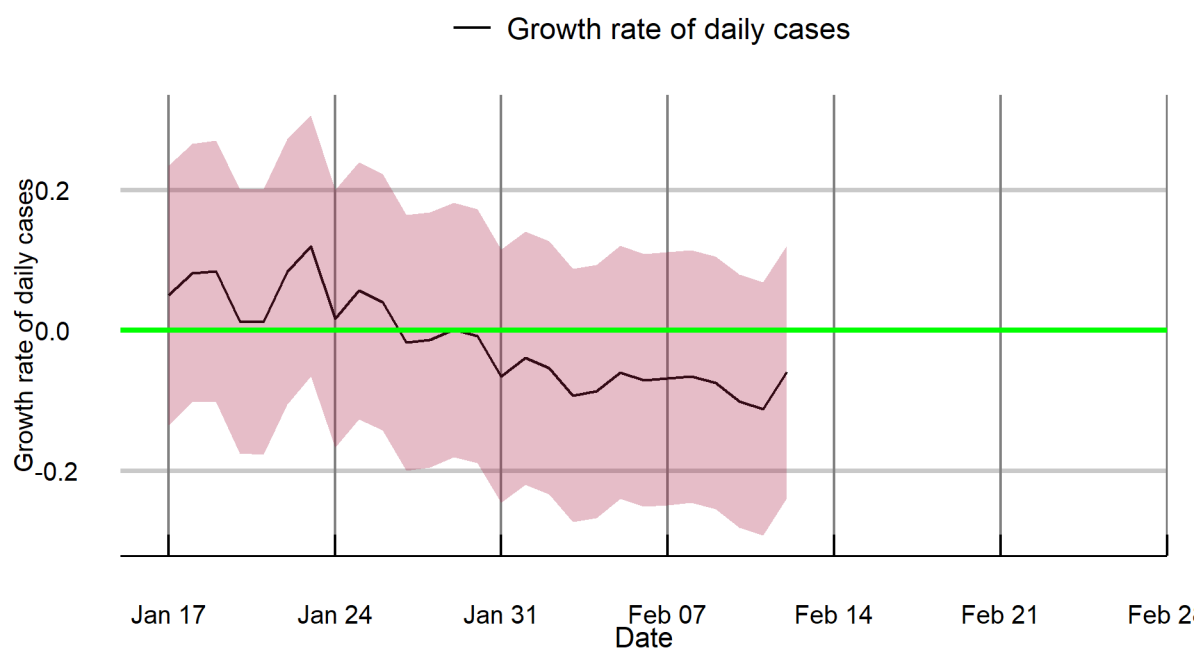
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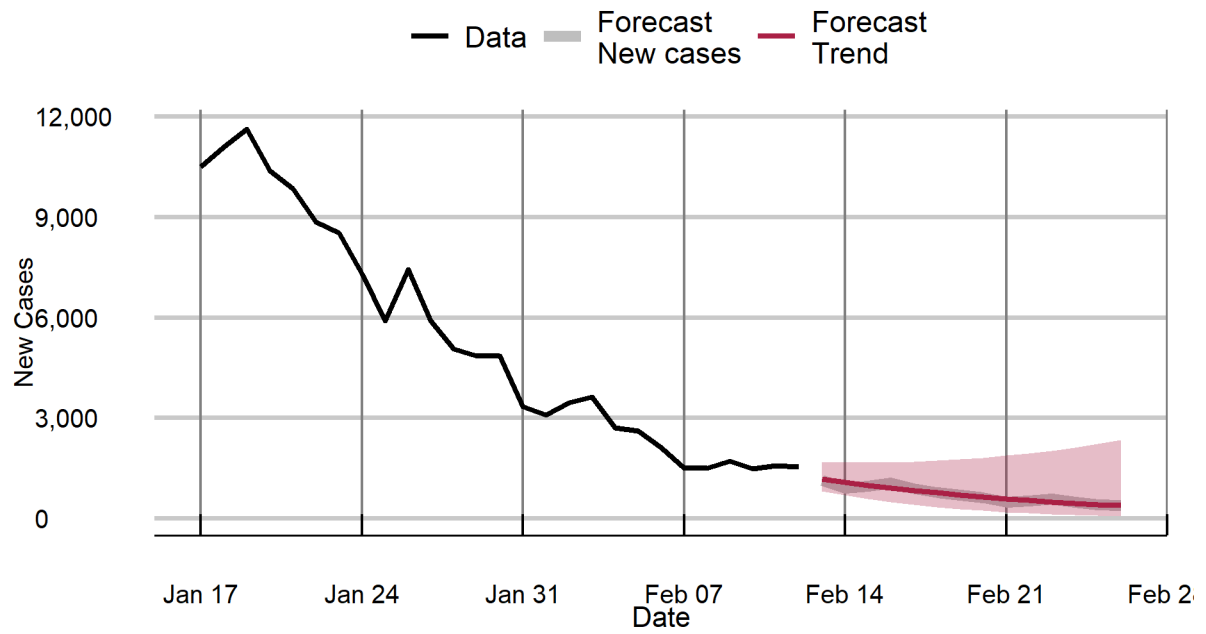
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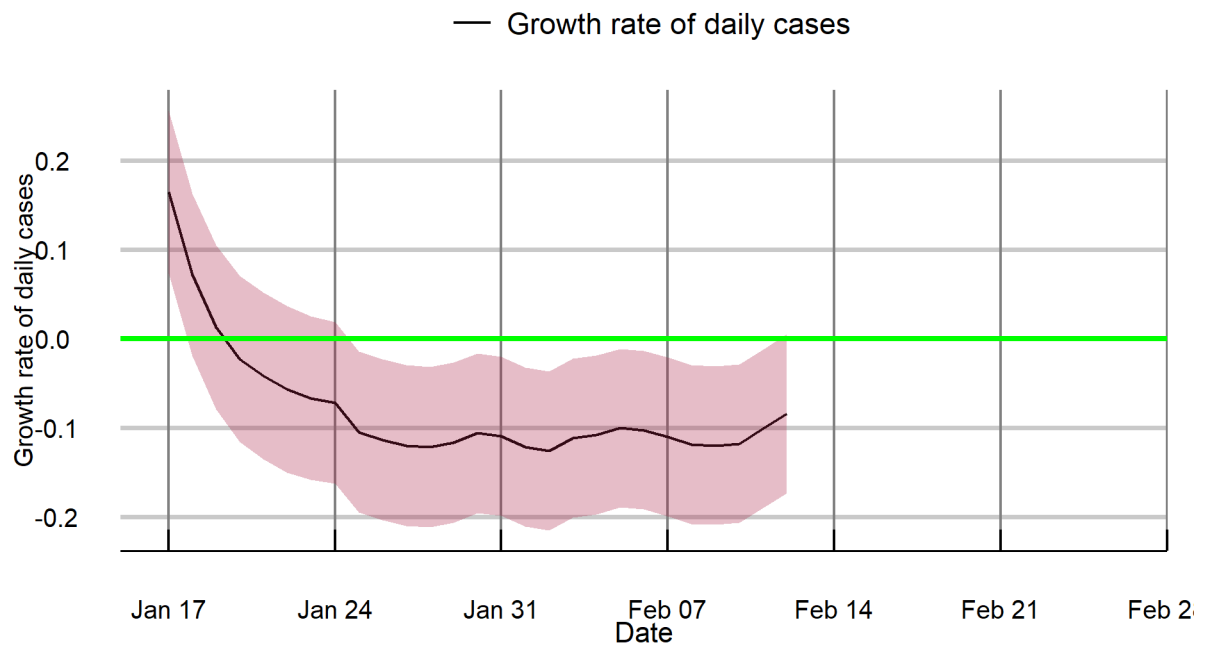
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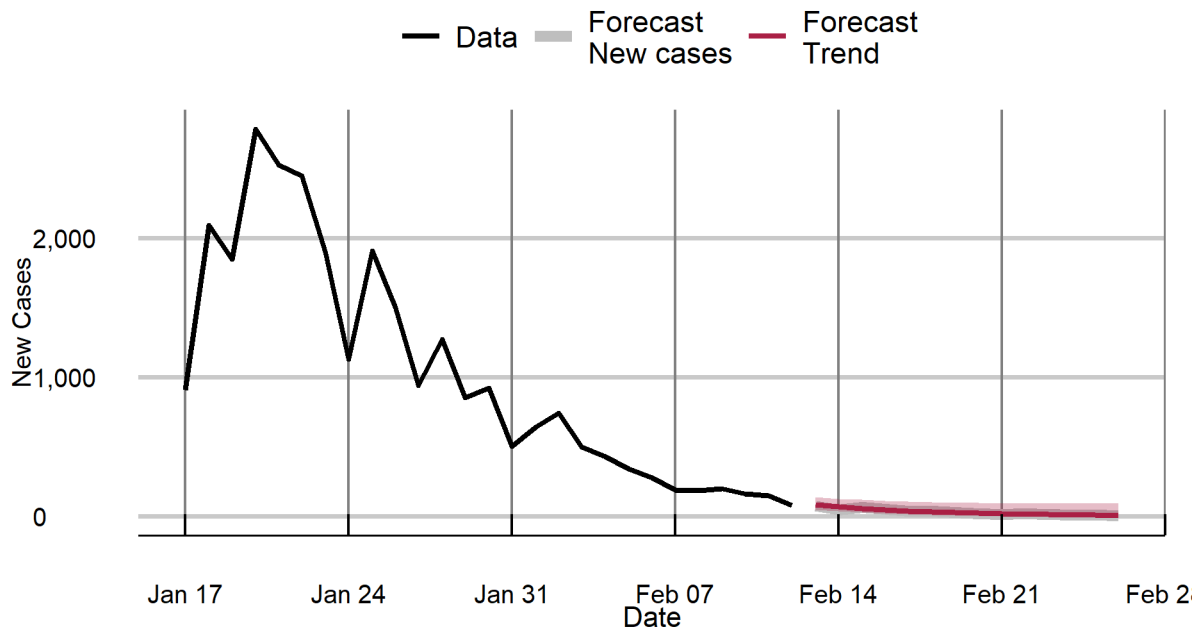
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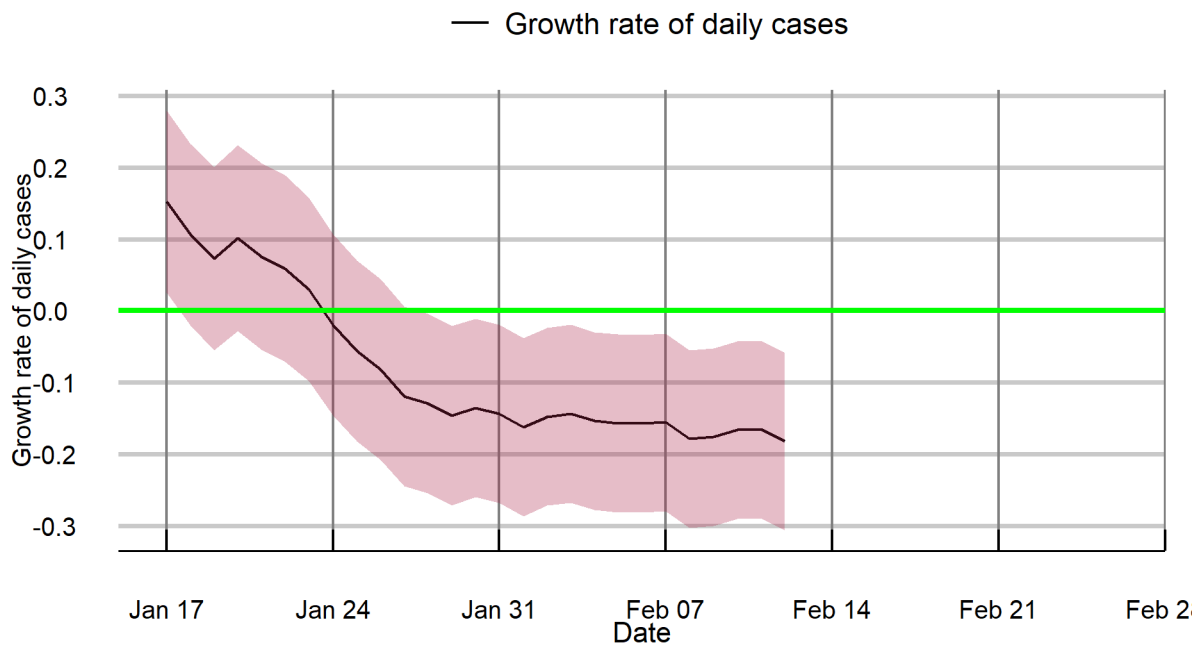
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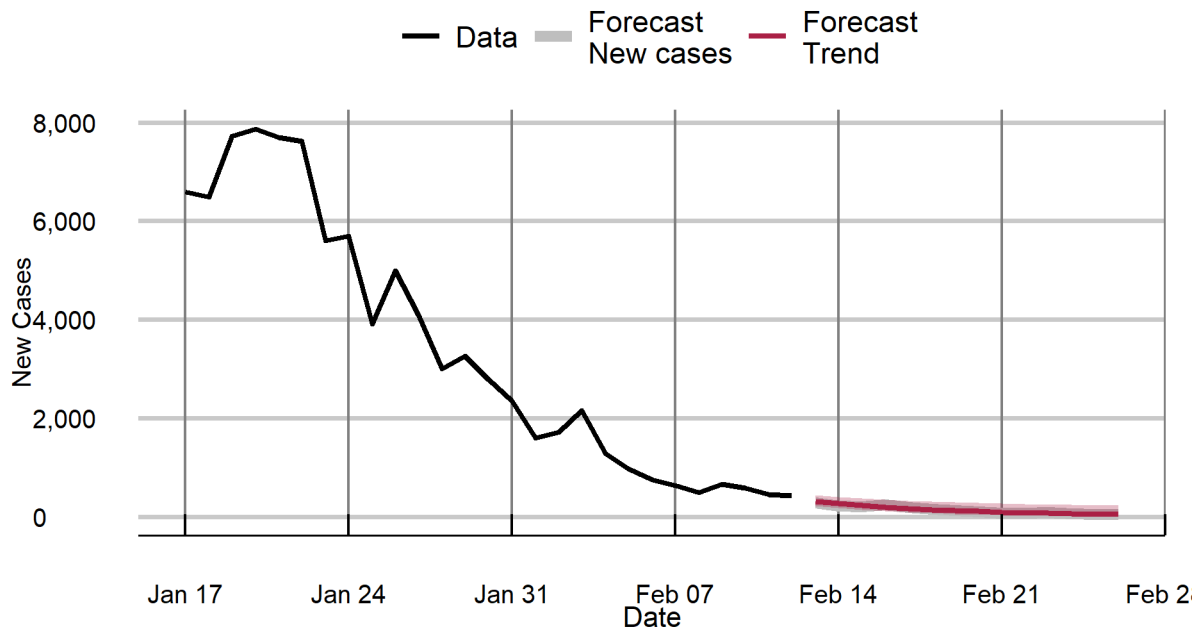
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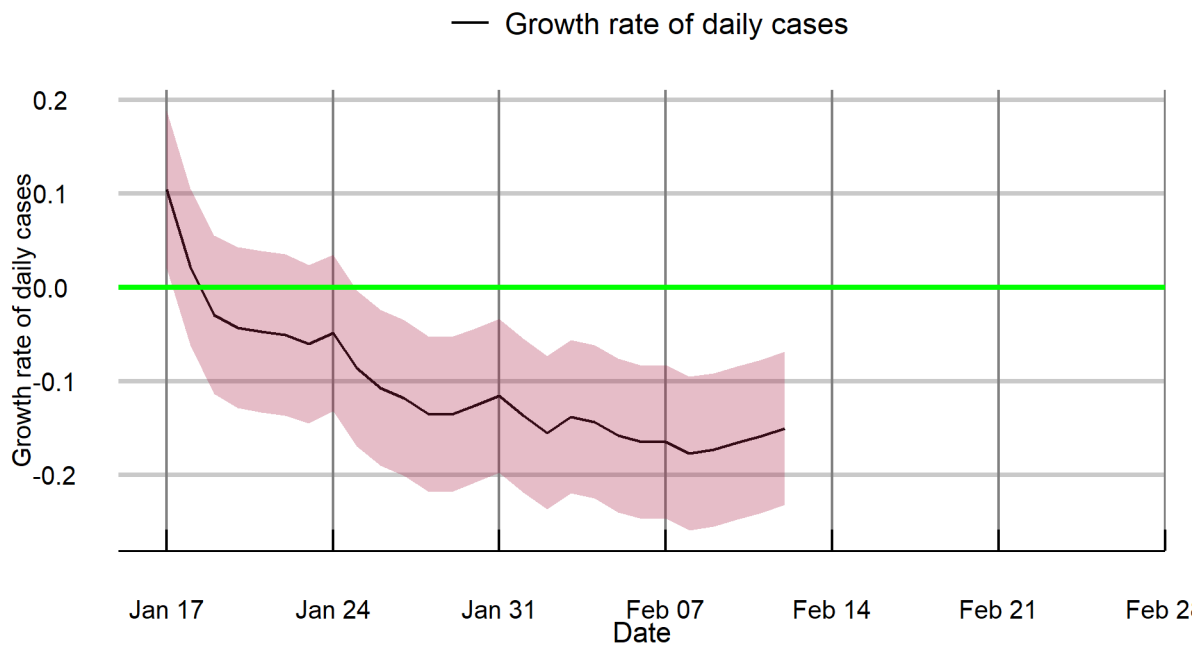
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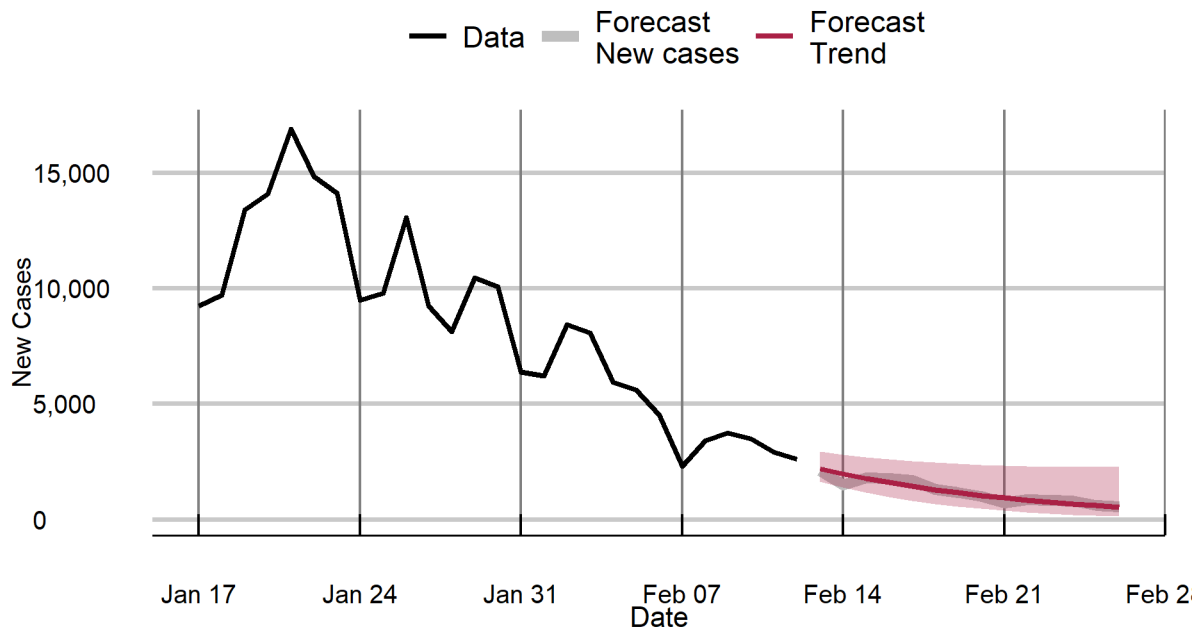
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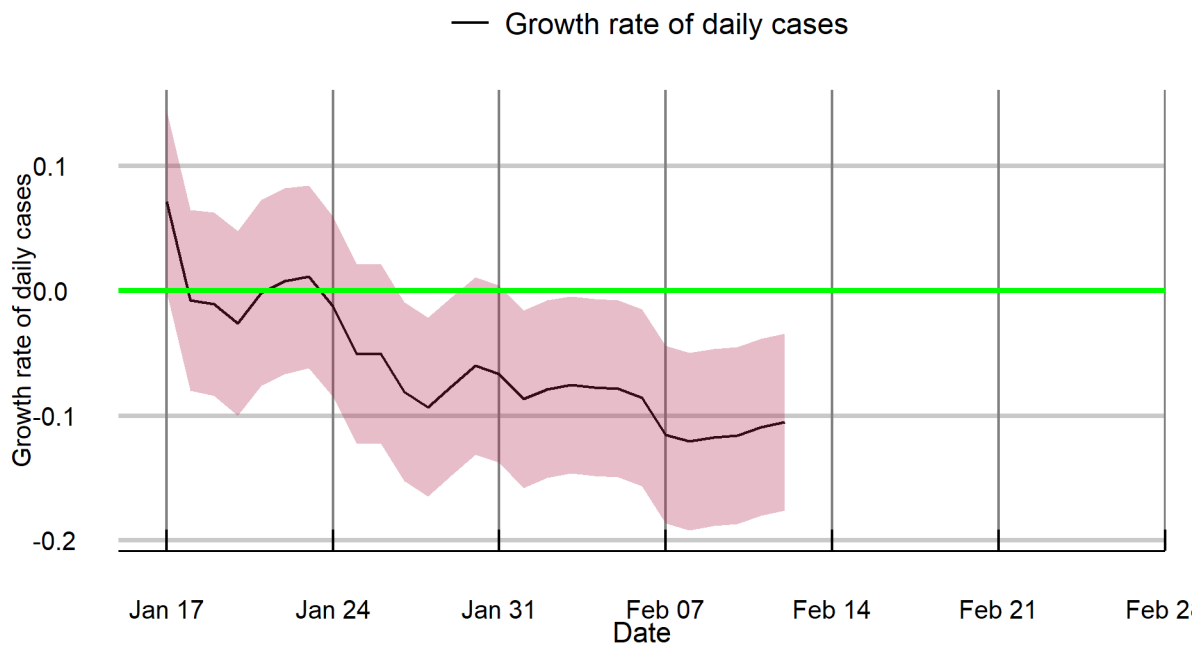
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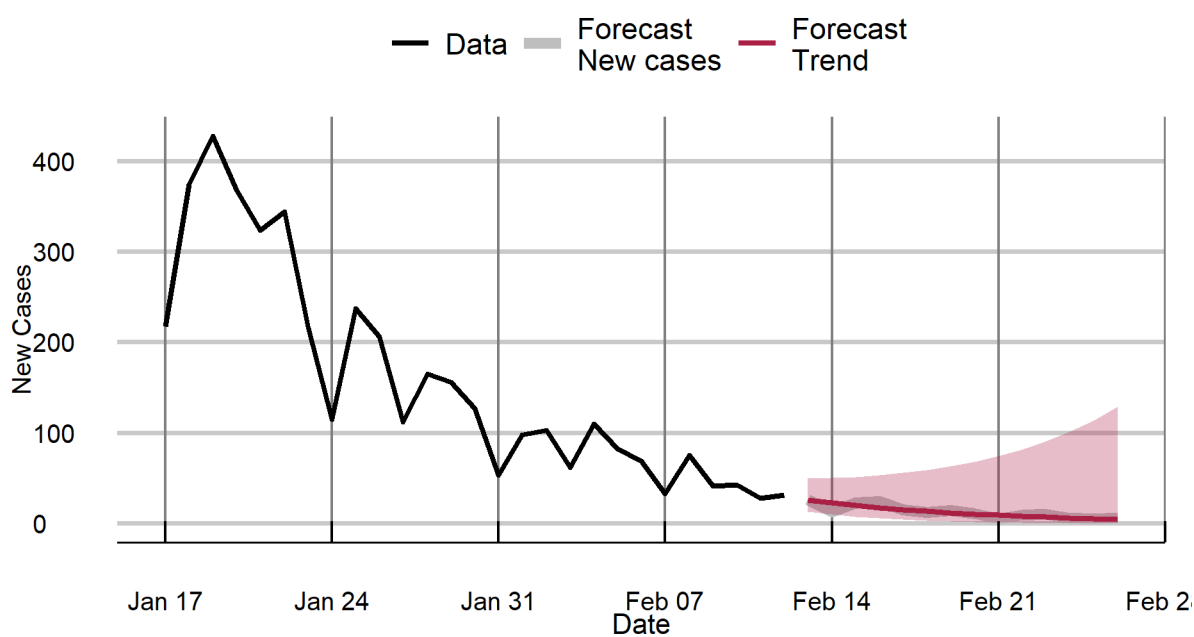
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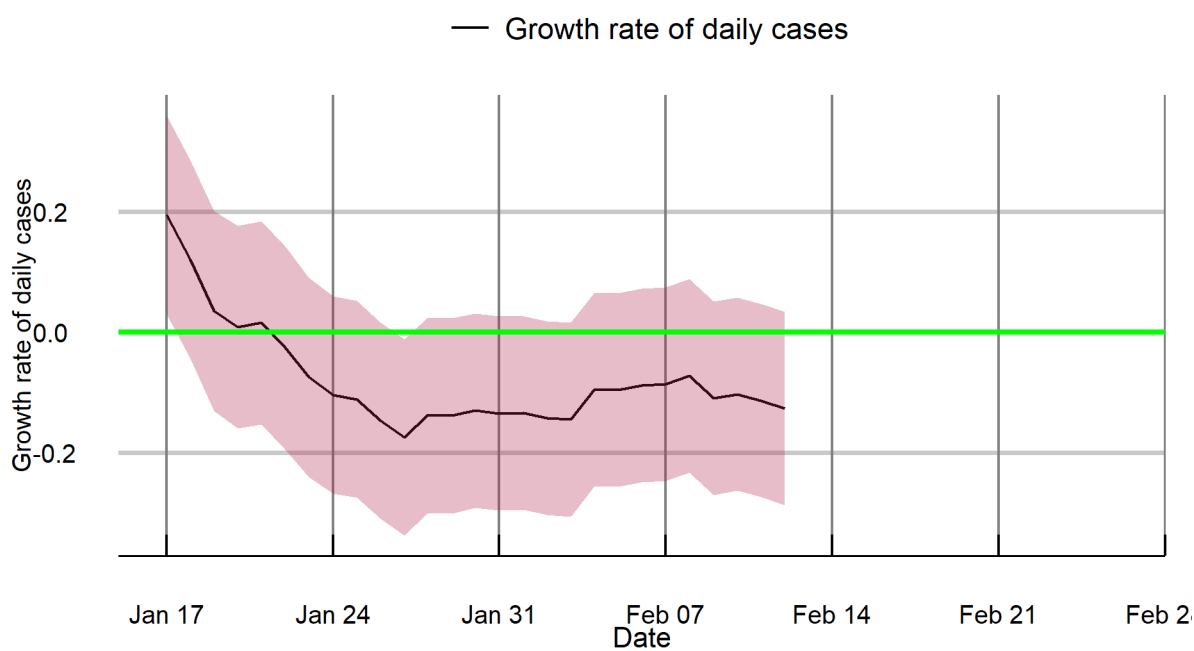
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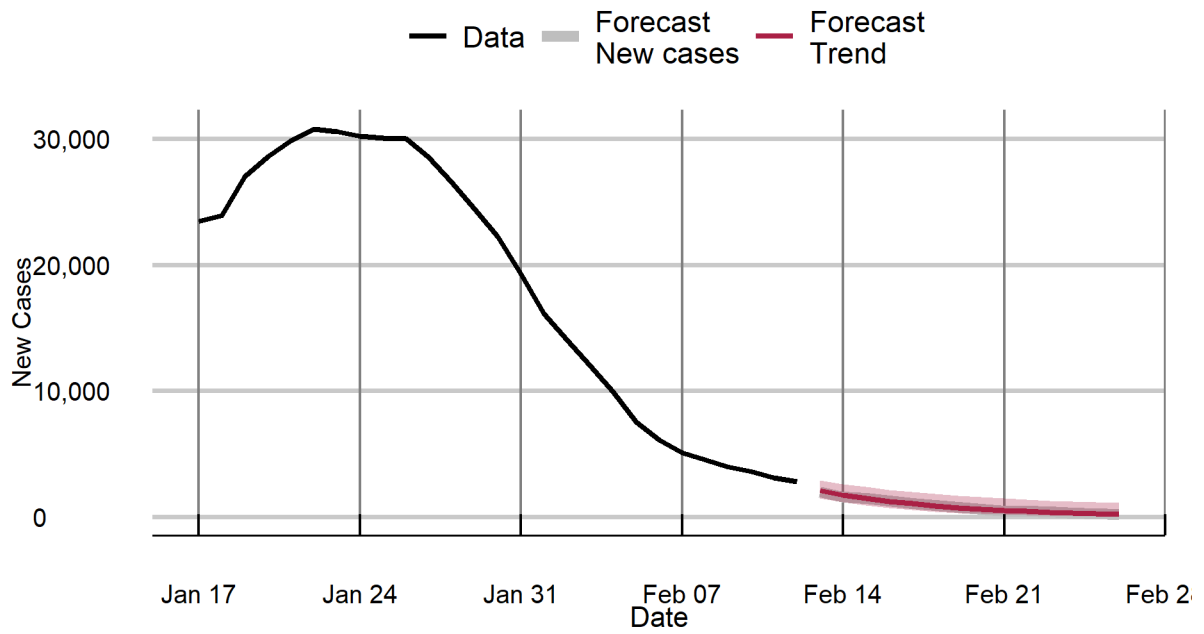
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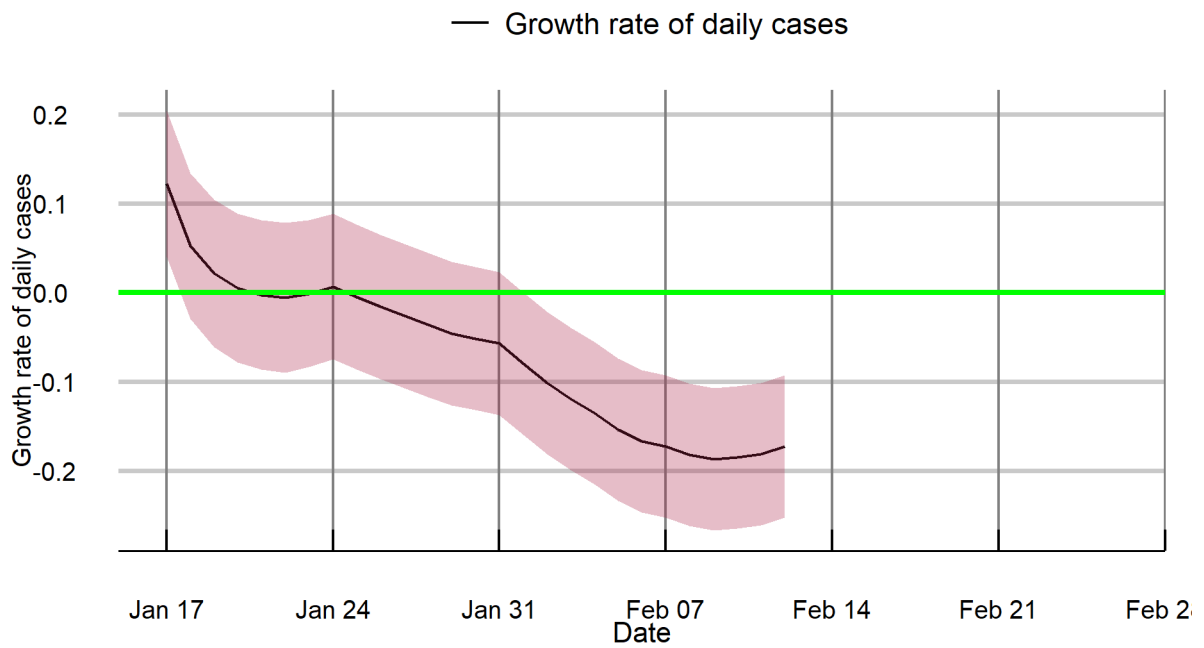
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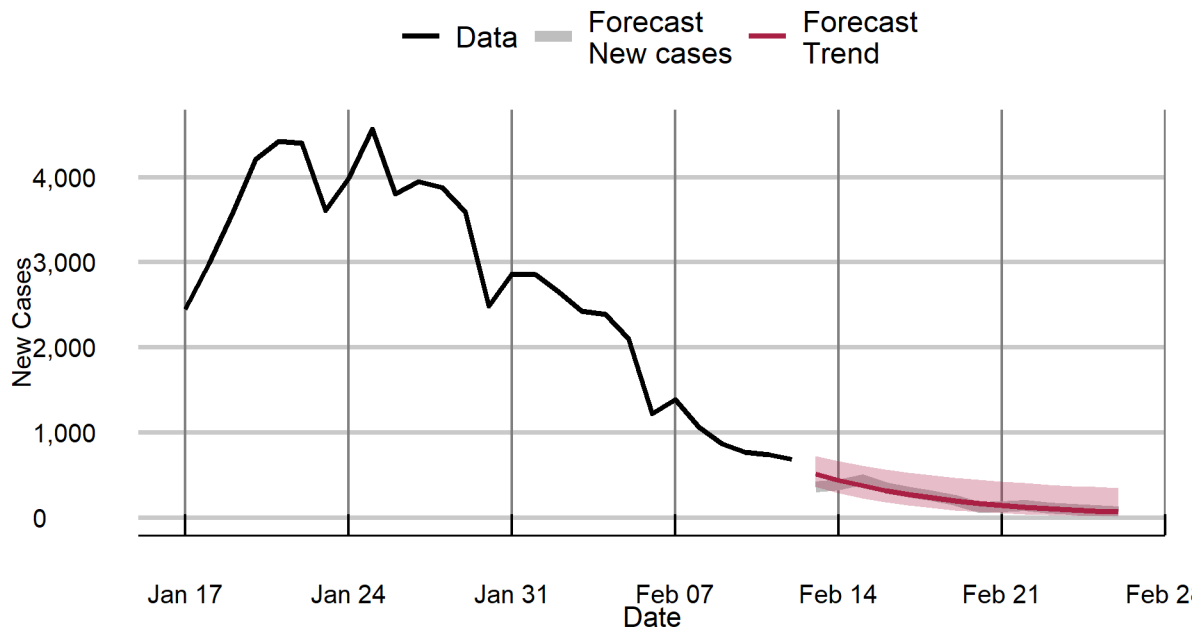
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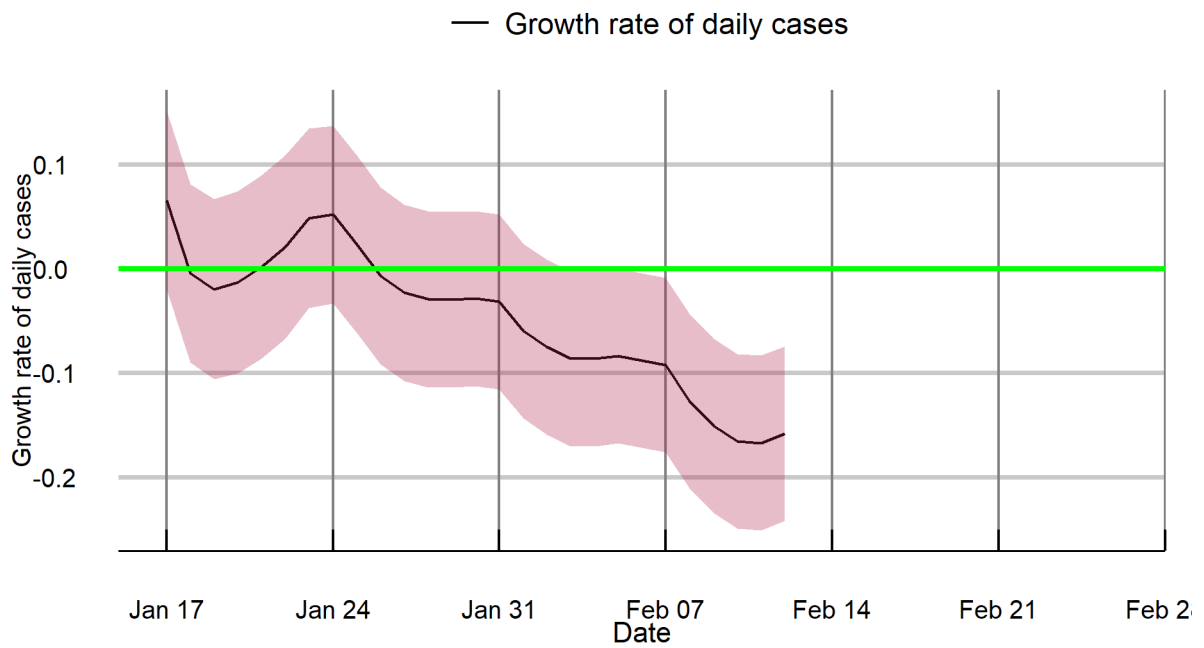
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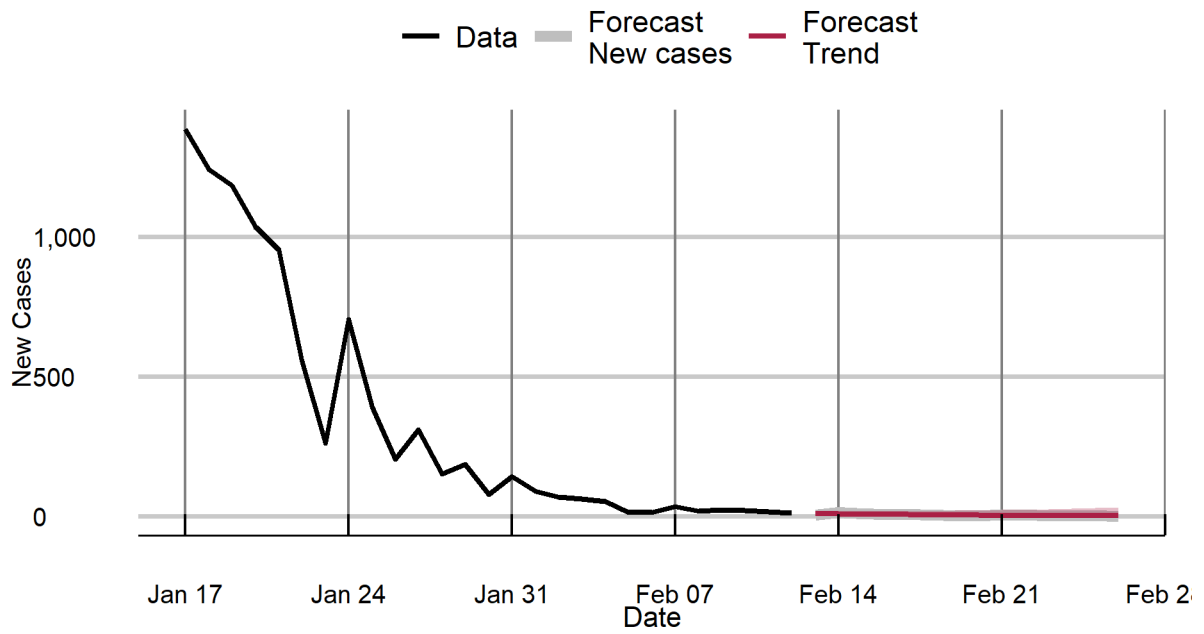
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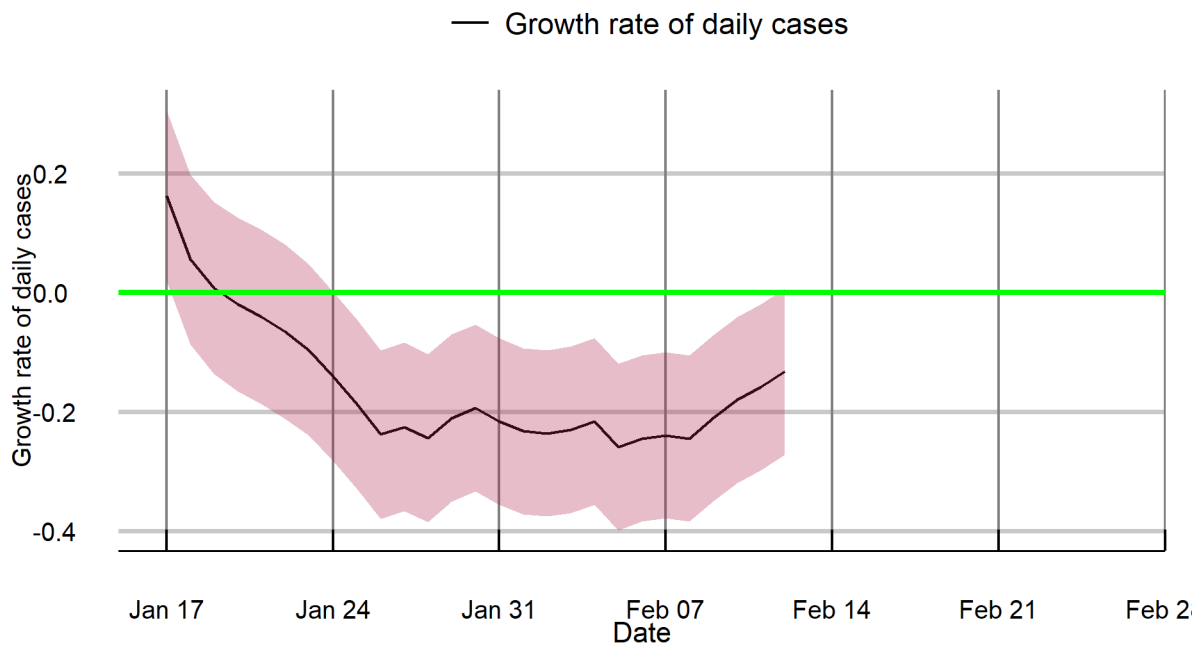
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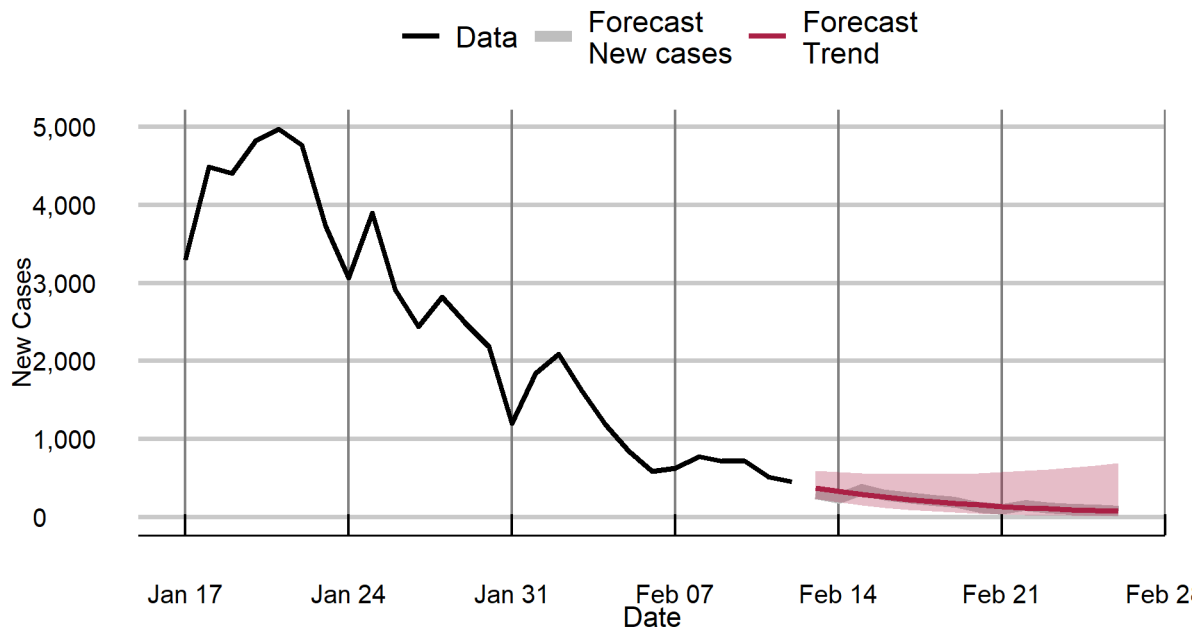
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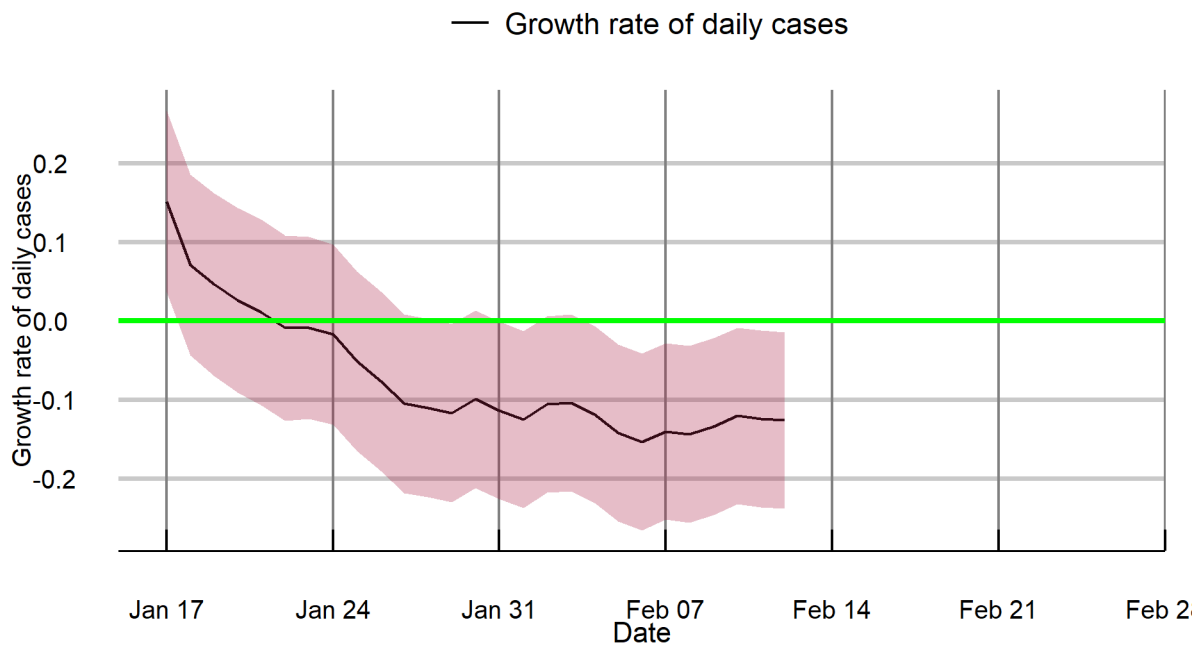
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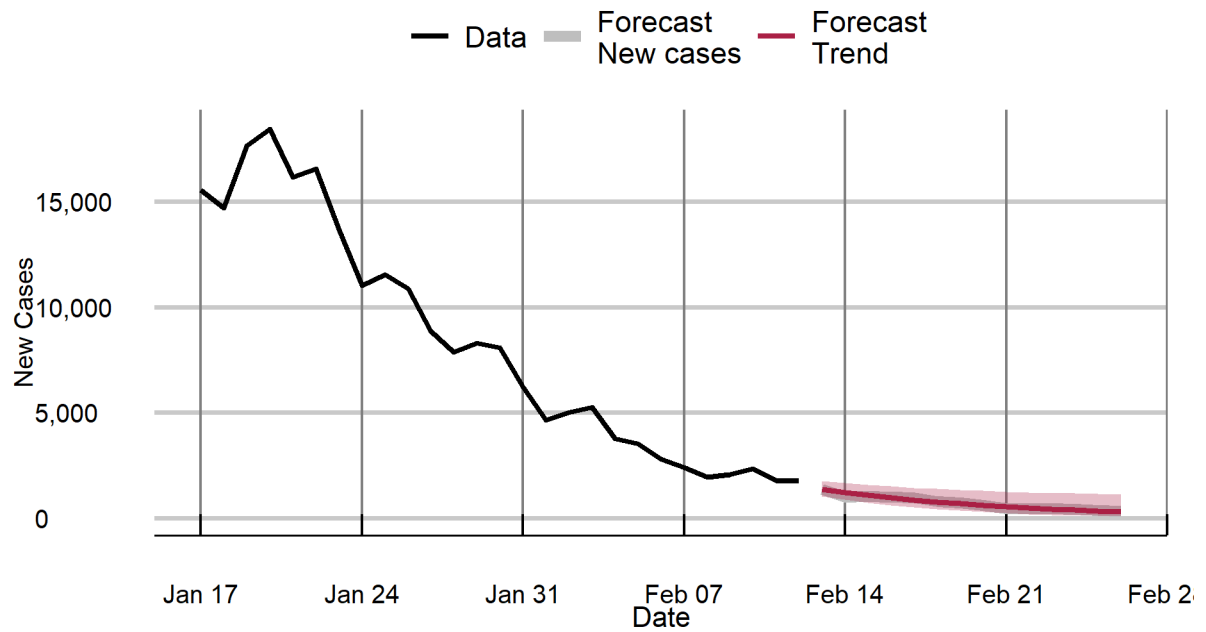
Uttarakhand



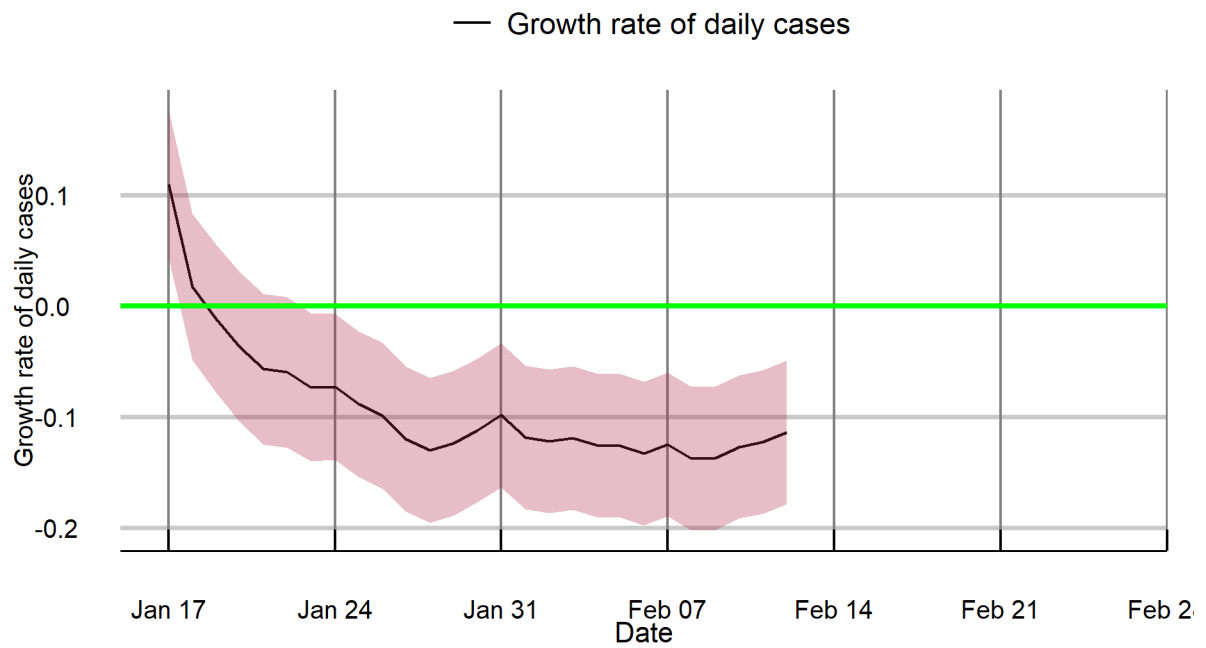
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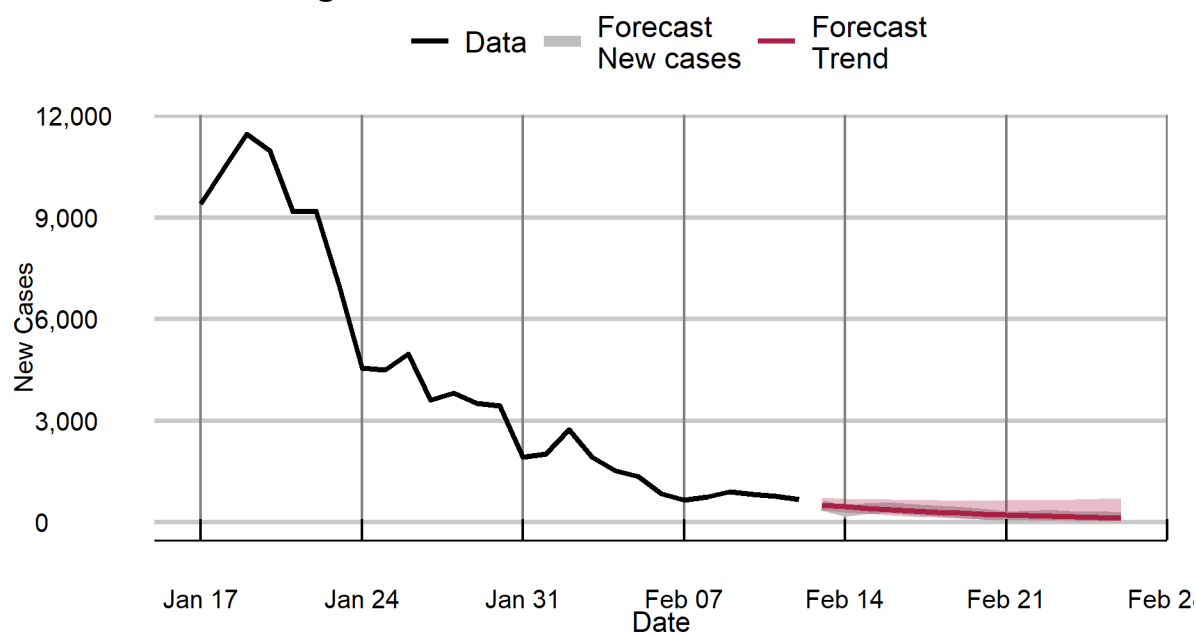
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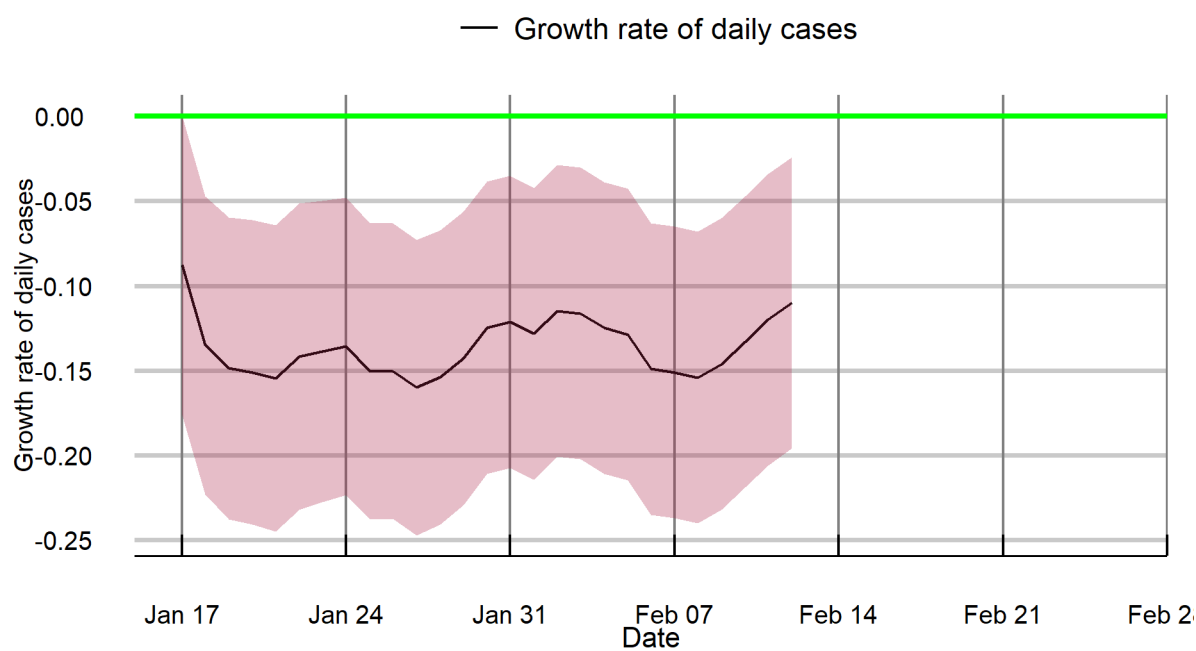
Uttar Pradesh



West Bengal



West Bengal



Notes

This tracker was developed by researchers at Cambridge Judge Business School and National Institute of Economic and Social Research, working with Health Systems Transformation Platform in India, as part of a pandemic monitoring series devoted to India and its states and union territories. It provides short term forecasts of the trajectory of the pandemic, identifying states and union territories that are at risk of increases in infection incidence.

Data: COVID-19 confirmed cases data are sourced from Johns Hopkins University (JHU), Center for Systems Science and Engineering (CSSE) and COVID19-Bharat API.

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/ozgix0yn/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.

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*, 18, 20210179, <https://royalsocietypublishing.org/doi/10.1098/rsif.2021.0179>. The confidence interval is based on one standard deviation, with coverage of 68%.

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.

Andrew Harvey*, Paul Kattuman*, Rajeev Sadanandan#, Stefan Scholtes*, Craig Thamotheram*

*University of Cambridge.

#Health Systems Transformation Platform.

*National Institute of Economic and Social Research

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