COVID-19 TRACKER: INDIA

11 July 2021
This tracker\(^1\) has been 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. The forecasts are based on a structural time series model that uses historical data in estimation but adapts to the trend emerging in the most recent period. The model is described in Harvey and Kattuman (2021) "Time series models based on growth curves with applications to forecasting coronavirus". *Harvard Data Science Review, Special issue 1 - COVID -19.*

*The reproduction number (Rt) for India increased further over the past week and now stands at 0.97, close to the threshold of one. The trend value of the daily growth rate of cases has risen further to -0.8 %. Newly reported COVID-19 cases are likely to decline marginally in the coming days. By 24 July 2021, reported cases per day can be expected to be about 37,000.*

*With their reproduction numbers exceeding one, daily reported cases are likely to increase in eight states: Arunachal Pradesh, Chhattisgarh, Himachal Pradesh, Kerala, Manipur, Mizoram, Sikkim, Tripura. Evidence suggests that in these eight states the positive daily growth rates of cases very likely accelerating (see pages 38-42). In many of the remaining states and union territories the daily growth rates of new cases, though currently negative, are trended upwards.*

*The dissimilarity among states in infection incidence, with a significant number expected to see increases in cases, carries huge potential for localised flare-ups to grow into a national wave through transmission spill overs. While a part of locally observed growth in reported cases may be due to increased testing, preventing geographic spill-overs between states is of high importance, just as much as controlling local spikes in infection.*

Mean absolute percentage error of the forecasts of daily cases in India given in the July 4 tracker, for the period July 5-10, was 7.9%. The accuracy of forecasts rely on the quality of the reported data. Changes in government pandemic policies and in transmission relevant social behaviour may cause realised numbers to depart from forecasts.

\(^1\) CJBS COVID-19 Tracker for India can be accessed at: [www.jbs.cam.ac.uk/covid-india](http://www.jbs.cam.ac.uk/covid-india)  
The companion spreadsheet contains all the estimates and forecasts.  
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Forecasts of daily new cases for the period 11 July 2021 to 24 July 2021, based on data till 10 July 2021. New COVID-19 cases is likely to number about 37,000 per day by 24 July 2021.

The filtered trend in the growth rate of daily new cases. Final date: 10 July 2021.
Bar chart shows point estimates of R and the ± 1 standard deviation confidence intervals.
Case forecasts and growth rates: States and Union territories

Andhra Pradesh

- Data
- Forecast New cases
- Forecast Trend

New Cases

- 7,500
- 5,000
- 2,500

Date
- Jun 15
- Jul 01
- Jul 15

Andhra Pradesh

- Growth rate of daily cases

Growth rate of daily cases

- 0.000
- 0.025
- 0.050
- 0.075

Date
- Jun 15
- Jul 01
- Jul 15
The nature of growth in new cases:
States with positive daily growth rates which are likely to be accelerating.
Himachal Pradesh: Probability that the case growth rate is accelerating rate as on 2021-07-10: 0.54

Kerala: Probability that the case growth rate is accelerating rate as on 2021-07-10: 0.66
Maharashtra: Probability that the case growth rate is accelerating rate as on 2021-07-10: 0.38

Manipur: Probability that the case growth rate is accelerating rate as on 2021-07-10: 0.67
Mizoram: Probability that the case growth rate is accelerating rate as on 2021-07-10: 0.8

Sikkim: Probability that the case growth rate is accelerating rate as on 2021-07-10: 0.63
Tripura: Probability that the case growth rate is accelerating rate as on 2021-07-10 : 0.51
Notes

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


**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 (2020b). A farewell to R: Time series models for tracking and forecasting epidemics. *Center for Economic Policy Research* (CEPR) working paper, 51. [https://cepr.org/content/covid-economics](https://cepr.org/content/covid-economics). 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.

**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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