COVID-19 TRACKER: INDIA

18 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 nudged up over the past week and now stands at 0.98, close to the threshold of one. The trend value of the daily growth rate of cases has risen to -0.5 %. Newly reported COVID-19 cases are likely to decline marginally in the days ahead. By 1 August 2021, reported cases per day is likely to be about 35,200.*

Daily reported cases are likely to increase in six states that have reproduction numbers currently exceeding one: Arunachal Pradesh, Kerala, Manipur, Mizoram, Nagaland, and Telangana (see page 4). The positive growth rates of cases appear to be accelerating in Kerala, Manipur, Mizoram, Nagaland, and Telangana (see pages 38-40). Notably, Arunachal Pradesh, Kerala, Manipur and Mizoram lead other Indian states in case rates normalised for population (page 6).

*It is important to restrain social and spatial spill-overs from areas of high infection incidence. It is worth noting that flare-ups that emerged in recent weeks in some states - Maharashtra, Chhattisgarh, Himachal Pradesh – appear to have abated.*

Mean absolute percentage error of the forecasts of daily cases in India given in the July 10 tracker, for the period July 11-17, was 4.4%. 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.

Contact: Paul Kattuman  <p.kattuman@jbs.cam.ac.uk>
Forecasts of daily new cases for the period 19 July 2021 to 1 August 2021, based on data till 18 July 2021. New COVID-19 cases is likely to number about 35,200 per day by 1 August 2021.

The filtered trend in the growth rate of daily new cases: -0.5% as on 18 July 2021.
Daily growth rates of cases (%)
Trend values as on 18 July 2021
7 day case rates per 100,000
Trend values as on 18 July 2021
Case forecasts and growth rates: States and Union territories

Andhra Pradesh

- Data
- Forecast
  - New cases
  - Trend

New Cases

Date:
- Jun 15
- Jul 01
- Jul 15
- Aug 01

Andhra Pradesh

Growth rate of daily cases

Date:
- Jun 15
- Jul 01
- Jul 15
- Aug 01
Chandigarh

- Data
- Forecast
- New cases
- Trend

New Cases

Jun 15  Jul 01  Jul 15  Aug 01

Chandigarh

Growth rate of daily cases

Jun 15  Jul 01  Jul 15  Aug 01

Growth rate of daily cases
Sikkim

- Data
- Forecast
- New cases
- Trend

New Cases

Jun 15  | Jul 01  | Jul 15  | Aug 01

Growth rate of daily cases

Jun 15  | Jul 01  | Jul 15  | Aug 01
The nature of growth in new cases:
States with positive daily growth rates which are likely to be accelerating
Mizoram: Probability that the case growth rate is accelerating as on 2021-07-18 : 0.62

Nagaland: Probability that the case growth rate is accelerating as on 2021-07-18 : 0.82
Telangana: Probability that the case growth rate is accelerating as on 2021-07-18: 0.51

2021-06-28 / 2021-07-18

![Graph showing the probability trend]


Probability values range from 0.2 to 0.8.
India: Accuracy of last week’s forecasts
Mean Absolute Percentage Error: 4.41%

Cases

2021-07-11 / 2021-07-17

11/07/2021  17/07/2021

Actual
Forecast Trend
Forecast
lower bound
upper bound
Notes

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


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. 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.

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

*University of Cambridge.
*Health Systems Transformation Platform.
*National Institute of Economic and Social Research