

## **Excess mortality in Uttar Pradesh during the COVID-19 pandemic: A factsheet<sup>1</sup>**

### *What death registration data is available?*

Monthly deaths from Jan 2019 to April 2021 from Uttar Pradesh's civil registration system, for each of the state's 75 districts, are [available on github](#). The data was obtained via an RTI from the state's chief registrar of births and deaths, and reported [by Article 14](#). It is presumed the data is recorded according to date of registration. According to the [2019 CRS report](#), UP had multiple systems of death registration, which were being integrated into a single system. It is not clear which system(s) this data pertains to, or what the effect of this streamlining of recording systems are on the available data.

### *What do we know about delays in registration?*

According to the [2019 CRS report](#), 52% of registrations occurred within 21 days, and 69% within 30 days. 15% of registrations occurred with a delay of over one year. There were thus very considerable delays in registration in the pre-pandemic period.

### *What do we know about registration coverage and trends in the state/within this system?*

According to the 2019 CRS report, during 2015, 2016, 2017, 2018 and 2019 respectively, UP saw an estimated 44.6%, 40.6%, 38.7%, 61.6% and 63.3% of deaths registered. Thus registration levels were somewhat unpredictable with an improving, but uncertain trend.

During 2019, total deaths in the available data were 82% of registered deaths in the state.

### *Are there risks of bias in using this data?*

There is a very high risk of bias in the data. In 49 of 75 districts there are mismatches of over 5% in total 2019 registrations between the available data and the 2019 CRS report. In 22 districts this mismatch is of more than 20%, and in 12 districts, the mismatch is more than 50%. In most cases totals in the data are lower than in the CRS report (indicating missing data); but there are seven districts in which total registrations in the data are more than 5% *greater* than in the 2019 CRS report. In the available data, there are also zeros interspersed with positive entries for monthly registrations in several districts suggesting possible clerical or typographical errors.

### *Were there unusual fluctuations in registration during the early part of 2020?*

According to this data, there were major fluctuations in registrations during 2020. Registrations during March-May 2020 were 45% below 2019 values. Registrations during the six month period Feb-July 2020 were 26% below values for the same period during 2019. This could reflect missed or delayed registrations as a consequence of lockdown/pandemic disruption.

### *Are there any possible choices for baseline deaths and hence excess deaths?*

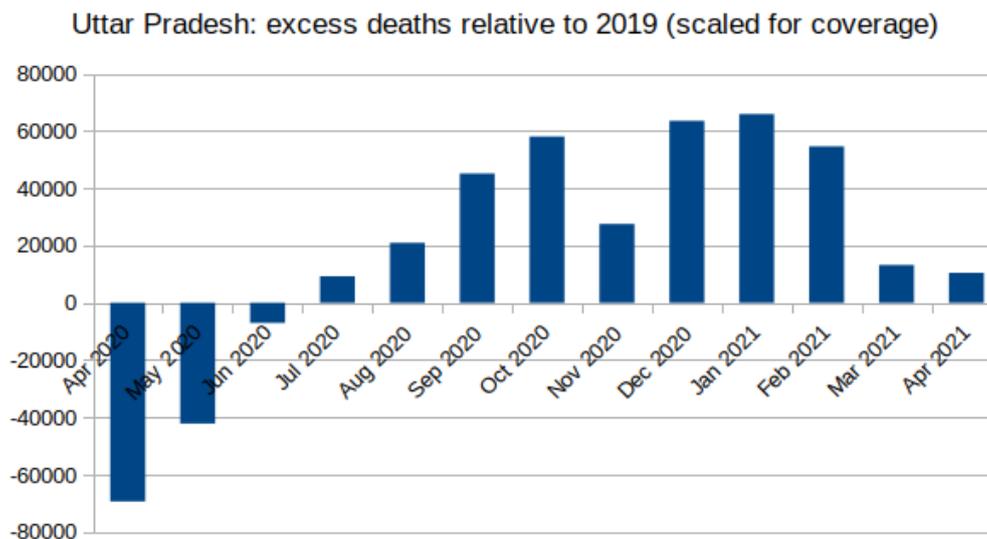
There is no monthly data prior to 2019 that is available. Although 2019 values can give baseline expectations for registered deaths during the pandemic, there are substantial risks in doing this. If we choose to do this, then excess registered deaths calculated against such a baseline must be rescaled to account for registration coverage in the available data. Given the limited integrity of the underlying data, we should treat the outcome of such an exercise with considerable caution.

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<sup>1</sup> Prepared on 9<sup>th</sup> November 2021, by Murad Banaji and Aashish Gupta.

*What do monthly excess deaths look like relative to a 2019 baseline?*

If we do use a 2019 baseline and scale excess deaths for coverage, we obtain the following plot of excess deaths during April 2020 to April 2021.



According to this data, cumulative excess deaths are negative until October 2020, followed by a very significant surge in registrations during late 2020 and early 2021.

*What is the scale of first wave excess deaths implied by this data?*

Taking the data at face value, after scaling for coverage, the state saw around 227,000 excess deaths during April 2020-Feb 2021 relative to a 2019 baseline. This would amount to a 17% surge in mortality, or 1.0 excess deaths per 1000 population. This could, however, be an under-estimate, given the evidence of severe disruption to registration in UP, low integrity of the underlying data, and likely higher increase in mortality in the population not covered by the civil registration system.

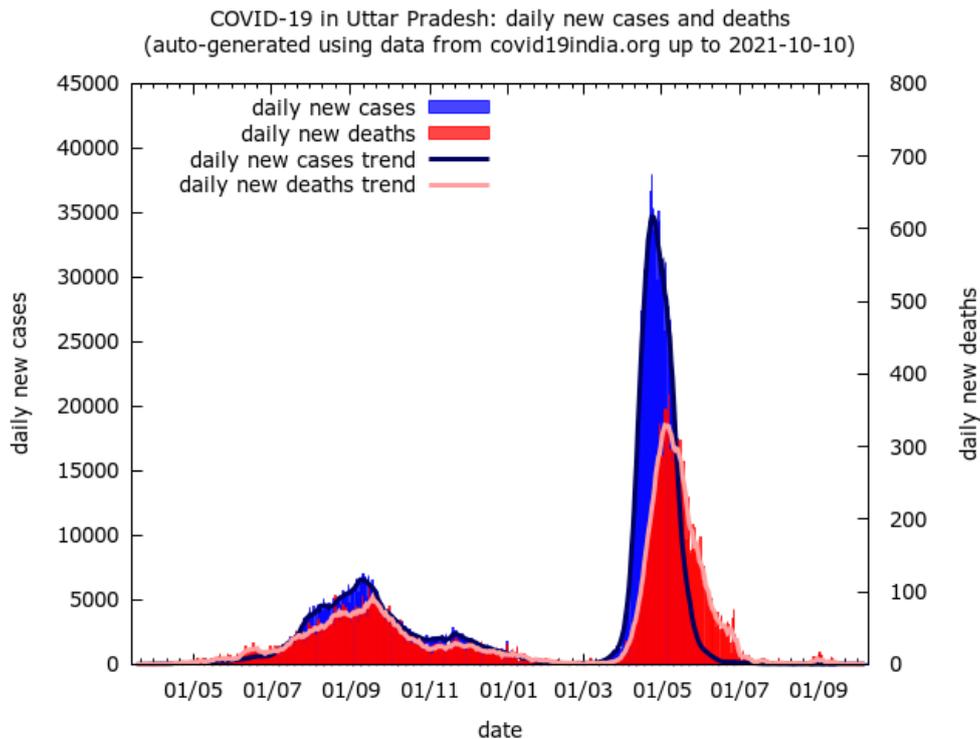
*Are there notable features in the death registration data?*

The most notable features of the data are:

- Its low quality, including major unexplained mismatches with previously reported 2019 data.
- Cumulative excess deaths are negative until October 2020, indicative of severe registration disruption; and
- The significant level of excess deaths during December 2020-February 2021 relative to a 2019 baseline. It is unclear whether this reflects an improved level of registration, delayed registrations, undetected COVID-19 spread, or some other factor.

*What are the broad features of the state's COVID-19 epidemic so far?*

The trajectory of recorded COVID-19 cases and deaths, using data from [covid19india.org](https://covid19india.org), is shown below.



The state's first wave peak in daily cases, at around 6,600 daily cases, occurred around September 9, 2020. The second wave peak, at around 35,000 daily cases occurred around April 24, 2021.

*How does the mortality data align with official COVID-19 data?*

There is a weak association between monthly recorded COVID-19 deaths and monthly excess deaths (relative to a 2019 baseline using the available data) during April 2020-February 2021: the correlation coefficient is 0.34.

If taken at face value, overall excess deaths during April 2020-Feb 2021, relative to a 2019 baseline, were 26 times recorded COVID-19 deaths.

The mortality data does not include May 2021, so it is not possible to come to any conclusions about the second wave.

*Other notes*

We should be cautious about drawing any conclusions based on this data until the reasons for the mismatches with historical data are clearer. If death registration statistics becomes available by date of death, it will become clearer to what extent the high registrations during Dec 2020-Feb 2021 reflect delayed registration of deaths which took place considerably earlier. In any case, given the low integrity of the underlying data, large scale mortality surveys will be necessary to ascertain the scale of pandemic mortality in Uttar Pradesh.