

Excess mortality in Bihar during the COVID-19 pandemic: A factsheet¹

What death registration data is available?

Monthly deaths registered in Bihar's online civil registration system, from Jan 2018 to May 2021, are [available on github](#). The data was reported [on NDTV](#). The data is recorded according to date of registration.

What do we know about delays in registration?

There is no information on registration delays in Bihar in the [2019 CRS report](#).

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, Bihar saw an estimated 29.2%, 25.7%, 38.7%, 31.2% and 51.6% of deaths registered. [According to NFHS-5](#), registration levels were 37.1% during the three years prior to the NFHS (which was conducted between July 2019 and February, 2020 in the state). This is broadly consistent with the implied 36.8% registration over 2016-2019, and 40.6% registration over 2017-2019 in the 2019 CRS report.

During 2018 and 2019, the online registration system captured 85% and 98% of registered deaths in the state, respectively.

Are there risks of bias in using this data?

There is a high risk of bias in the data. There are large fluctuations in registration coverage in the state. We have little knowledge of delays in registration. Large fluctuations in registrations during the early part of 2020 complicate the picture further.

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

There were significant fluctuations in registration during the early part of 2020. Registrations during March-May 2020 were 13% below 2019 values. Registrations during the six month period March-August 2020 were 4% below values for the same period during 2019, even though first wave recorded COVID-19 cases and deaths in the state peaked in the first half of August 2020.

What are possible choices for baseline deaths and hence excess deaths?

2019 values can give baseline expectations for registered deaths during the pandemic. Excess registered deaths calculated against such a baseline can then be rescaled to account for registration coverage in the online system.

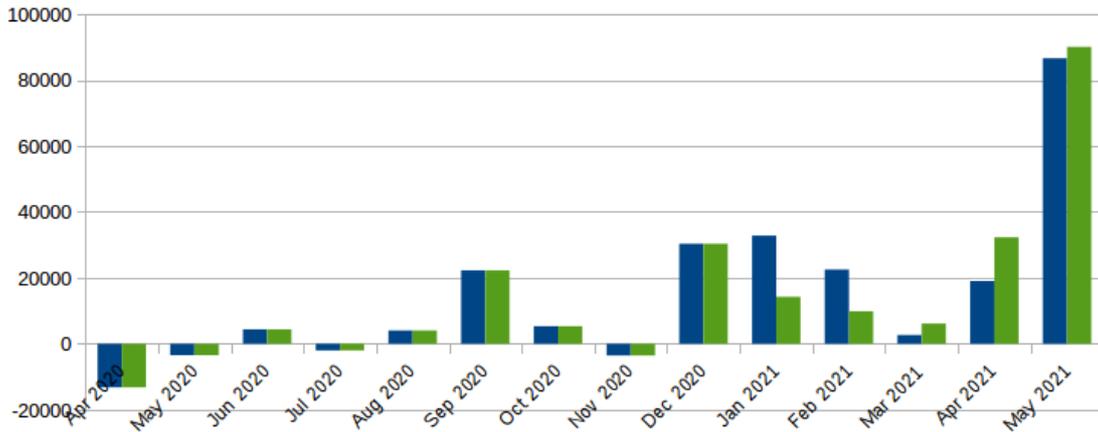
Another alternative is to use 2019 registrations as a baseline for April-December 2020, and January-May 2020 as a baseline for registrations during the same period in 2021. Assumed registration coverage is based on 2019 data for either baseline. We refer to this as a "2019-20 baseline".

What do monthly excess deaths look like relative to various baselines?

Below is a plot of excess deaths during April 2020 to May 2021, relative to a 2019 baseline and a 2019-20 baseline.

¹ Prepared on 27th August 2021, by Murad Banaji and Aashish Gupta.

Bihar: excess deaths relative to 2019 (blue) and 2019-20 (green) baselines, scaled for coverage



Cumulative excess deaths according to these baselines are negative until September 2020, after the peak in official COVID-19 deaths.

What is the scale of first and second wave excess deaths relative to various baselines?

We have the following estimates (official COVID-19 deaths are from covid19india.org):

	excess deaths (to nearest 1000)		excess deaths per 1000 population		surge relative to baseline		ratio of excess deaths to official COVID-19 deaths	
	2019 baseline	2019-20 baseline	2019 baseline	2019-20 baseline	2019 baseline	2019-20 baseline	2019 baseline	2019-20 baseline
Apr 2020-Feb 2021	99	68	0.8	0.6	16%	10%	64.5	44.3
March-May 2021	108	129	0.9	1.1	71%	98%	29.9	35.5
Apr 2020-May 2021	208	197	1.7	1.6	26%	25%	40.2	38.1

According to these calculations, around 48% of the total excess deaths upto May, 2021 occurred during March-May 2021. Given the lack of knowledge about reporting delays, and the likely continued excess mortality in June, we should not infer that Bihar's first wave was necessarily as deadly as the second.

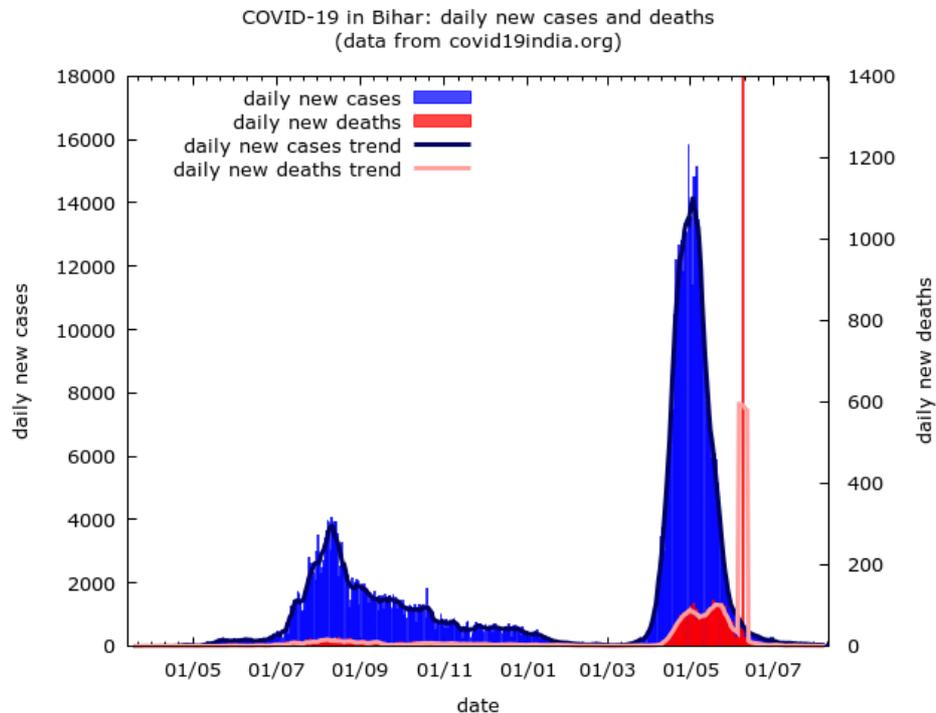
Are there other notable features in the death registration data?

The most notable features of the data are:

- The cumulative excess deaths are negative until September 2020, indicative of registration disruption and leading to the risk of underestimating early excess mortality; and
- The significant level of excess deaths during December 2020-February 2021, especially relative to a 2019 baseline. These are considerably reduced relative to a 2019-20 baseline. It is unclear whether this reflects an improved level of registrations, 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, is shown below.

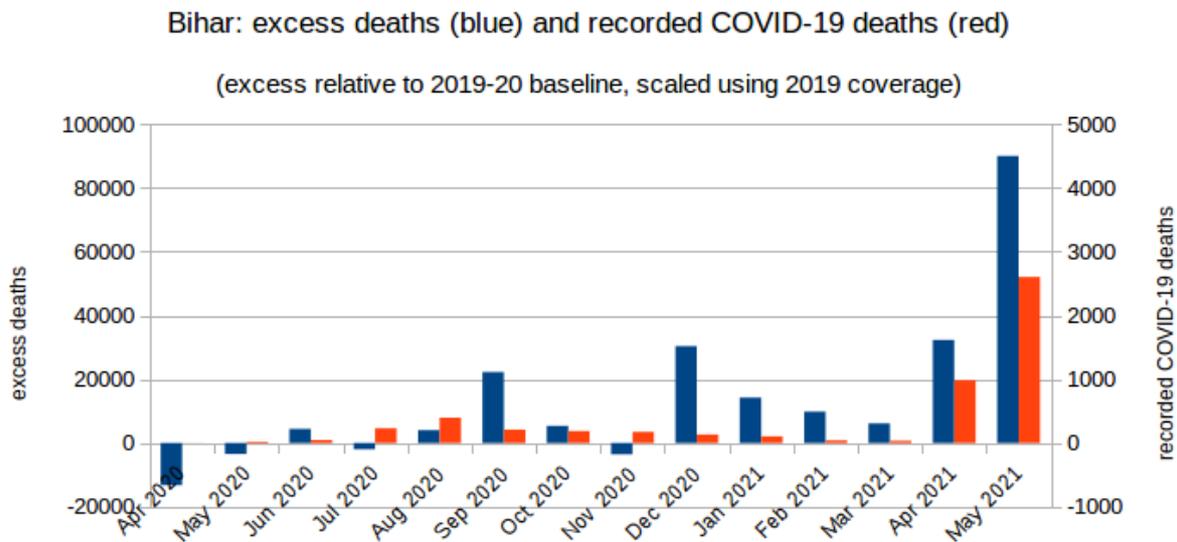


The state's first wave peak in daily cases, at around 3800 daily cases, occurred around August 11, 2020. The second wave peak, at around 14000 daily cases occurred around May 3, 2021.

In early June 2021, the state's [official death toll was revised upwards](#) by 5424 deaths, following an order from the Patna high court.

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

Excess deaths relative to 2019-20 values, alongside recorded COVID-19 deaths from covid19india.org, are plotted below.



There is a very weak association between monthly recorded COVID-19 deaths and monthly excess deaths (relative to a 2019-20 baseline) during the first wave: during April 2020-February 2021, the correlation coefficient is 0.18. This rises to 0.90 over the period April 2020 to May 2021. Relative to a 2019 baseline during April 2020-February 2021, the correlation coefficient is 0.04, rising to 0.82 over April 2020-May 2021.

Other notes

We need to be cautious about drawing conclusions on the basis of Bihar's mortality data, whether official COVID-19 deaths, or registered deaths. The low coverage of death registration, uncertainty about delay, and strong trends and variability in the data, lend considerable uncertainty to conclusions based on this data. Unlike in most other states studied there is little association between monthly excesses and recorded COVID-19 deaths. Using date-of-death data rather than date-of-registration data could add some clarity about possible registration disruption or trends. This document will be updated when such data becomes available.